Chapter 3
2001 Toxics Release Inventory Data for PBT Chemicals

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INTRODUCTION

For the reporting year 2000, TRI was expanded to include certain new persistent bioaccumulative toxic (PBT) chemicals. In addition, reporting thresholds were lowered for both the newly-added PBT chemicals and certain PBT chemicals already on the TRI list. In a rule (64 FR 58666) finalized on October 29, 1999, EPA added six PBT chemicals and one PBT chemical compound category. Two of the chemicals were added to the Polycyclic Aromatic Compounds (PACs) category. The rule also lowered reporting thresholds for 15 PBT chemicals and three PBT chemical categories (see Box 3-1).

Reporting thresholds for lead and lead compounds were lowered in a second PBT chemical rule (66 FR 4500) finalized on January 17, 2001. The lower reporting threshold and requirements for lead and lead compounds became effective for the 2001 reporting year and apply to all lead and lead compounds except for lead when contained in stainless steel, brass, or bronze alloys.

This chapter of the *2001 Toxics Release Inventory Public Data Release Report* presents TRI data for the PBT chemicals for 2001 and for 2000-2001.

Prior to the changes for the PBT chemicals, the reporting threshold for all chemicals was 25,000 pounds for manufacturing or processing the chemical and 10,000 pounds if otherwise used. Because PBT chemicals persist and bioaccumulate in the environment, they have the potential to pose greater exposure to humans and the environment over a longer period of time, making even small quantities of these chemicals a concern. Therefore, EPA established lower thresholds for these chemicals. For those chemicals that are persistent and bioaccumulative, a threshold of 100 pounds manufactured, processed or otherwise used was established. For the subset of PBT chemicals that are *highly* persistent and *highly* bioaccumulative, a threshold of 10 pounds was established. In addition, because dioxin and dioxin-like compounds are highly persistent and highly bioaccumulative, but are generally produced in extremely small amounts, the threshold for dioxin and dioxin-like compounds was set at 0.1 grams, so that reporting would result.

This chapter provides an overview of the TRI data for each group of PBT chemicals (see Box 3-1). Data analyses in this chapter begin with summary tables that compare release and other waste management data for PBT chemicals. The chapter then presents separate sections on each PBT chemical group and its TRI data. Data for 2001 are presented for all PBT chemicals. Data for 2000 to 2001 are presented for all of the PBT chemicals except lead and lead compounds. Data for 2000 cannot be compared to that for 2001 for lead and lead compounds because of the change in reporting thresholds.

While the expansion of information on PBT chemical releases and other waste management activities through the TRI provides an invaluable source of environmental data, it is limited. TRI does not include all industrial sources or other sources of releases, for example agricultural applications of pesticides. Although these chemicals are known to exist in the environment for long periods of time, TRI data do not supply information on exposure and risk, but rather on releases that take place in a given calendar year. Chapter 1 explains the types of release and other waste management activities, and provides important information on factors and limitations to consider when using TRI data. In addition, more details on each PBT chemical, their sources, chemical characteristics, health and envi-

Box 3-1: PBT Chemicals on TRI list

CAS Number	PBT Chemicals	Reporting Threshold
—	**Dioxin and dioxin-like compounds category**	0.1 grams
	(including the following chemicals)	
67562-39-4	1,2,3,4,6,7,8 Heptachlorodibenzofuran	
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran	
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran	
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran	
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran	
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran	
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran	
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran	
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran	
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin	
		(pounds)
	Lead and Lead compounds category	
	(including the following chemicals)	
7439-92-1	Lead	100
—	Lead compounds	100
	Mercury and Mercury compounds category	
	(including the following chemicals)	
7439-97-6	Mercury	10
—	Mercury compounds	10

Box 3-1: PBT Chemicals on TRI list (continued)

CAS Number	PBT Chemicals	Reporting Threshold
—	**Polycyclic aromatic compounds (PACs)**	
	(including the following chemicals)	
191-24-2	Benzo(g,h,i)perylene	10
—	Polycyclic aromatic compounds category	100
	(including the following chemicals)	
56-55-3	Benzo(a)anthracene	
205-99-2	Benzo(b)fluoranthene	
205-82-3	Benzo(j)fluoranthene	
207-08-9	Benzo(k)fluoranthene	
206-44-0	Benzo(j,k)fluorene	
189-55-9	Benzo(r,s,t)pentaphene	
218-01-9	Benzo(a)phenanthrene	
50-32-8	Benzo(a)pyrene	
226-36-8	Dibenzo(a,h)acridine	
224-42-0	Dibenzo(a,j)acridine	
53-70-3	Dibenzo(a,h)anthracene	
194-59-2	7H-Dibenzo(c,g)carbazole	
5385-75-1	Dibenzo(a,e)fluoranthene	
192-65-4	Dibenzo(a,e)pyrene	
189-64-0	Dibenzo(a,h)pyrene	
191-30-0	Dibenzo(a,l)pyrene	
57-97-6	7,12-Dimethylbenz(a)anthracene	
193-39-5	Indeno[1,2,3-cd]pyrene	
56-49-5	3-Methylcholanthrene	
3697-24-3	5-Methylchrysene	
5522-43-0	1-Nitropyrene	
1336-36-3	**Polychlorinated biphenyls (PCBs)**	10
	Pesticides	
309-00-2	Aldrin	100
57-74-9	Chlordane	10
76-44-8	Heptachlor	10
465-73-6	Isodrin	10
72-43-5	Methoxychlor	100
40487-42-1	Pendimethalin	100
8001-35-2	Toxaphene	10
1582-09-8	Trifluralin	100
	Other PBT Chemicals	
118-74-1	Hexachlorobenzene	10
29082-74-4	Octachlorostyrene	10
608-93-5	Pentachlorobenzene	10
79-94-7	Tetrabromobisphenol A	100

ronmental effects and efforts being undertaken to reduce pollution can be found in the *2000 Toxics Release Inventory Public Data Release Report* (EPA 260-R-02-003). Because lead and lead compounds fall under the lower reporting thresholds for reporting year 2001, this chapter presents information in a separate section for lead and lead compounds.

Chemical Characteristics

Persistence

A chemical's persistence refers to the length of time the chemical can exist in the environment before being destroyed (i.e., transformed into another chemical species) by natural processes. The environmental media for which persistence is measured or estimated include air, water, soil, and sediment.

A distinction is made between persistence in a single medium (air, water, soil, sediment) and overall environmental persistence. Persistence in an individual medium is controlled by transport of the chemical to other media, as well as transformation to other chemical species. Persistence in the environment as a whole is a distinct concept based on the observations that the environment behaves as a set of interconnected media, and that a chemical substance released to the environment will become distributed in these media in accordance with the chemical's intrinsic (physical/chemical) properties and reactivity.

A common measure of persistence in an environmental medium is a chemical's half-life, or the amount of time necessary for half of the chemical present to be eliminated from the medium. If a toxic chemical meets any one of the media-specific criteria, it is considered to be persistent. However, in the PBT chemicals rulemaking EPA did not classify chemicals as PBT chemicals based solely on the air criterion.

Bioaccumulation

Bioaccumulation is a general term that is used to describe the process by which organisms may accumulate chemical substances in their bodies. Bioaccumulation can occur in plants and animals, including humans.

EPA has defined bioaccumulation as the net accumulation of a substance by an organism as a result of uptake from all environmental sources. The nondietary accumulation of chemicals in aquatic organisms is referred to as bioconcentration. EPA has defined bioconcentration as the net accumulation of a substance by an aquatic organism as a result of uptake directly from the ambient water through gill membranes or other external body surfaces.

A chemical's potential to bioaccumulate can be quantified by measuring or predicting the chemical's bioaccumulation factor (BAF). The BAF is the ratio of a substance's concentration in tissue of an aquatic organism to its concentration in the ambient water, in situations where both the organism and its food are exposed and the ratio does not change substantially over time. A chemical's potential to bioaccumulate can also be quantified by measuring or predicting the chemical's bioconcentration factor (BCF). The BCF is the ratio of a substance's concentration in tissue of an aquatic organism to its concentration in the ambient water, in situations where the organism is exposed through water only and the ratio does not change substantially over time. Because BAFs consider the uptake of chemicals from all routes of exposure they are considered better predictors of the accumulation of chemicals within fish than BCFs, which only consider uptake of chemicals directly from water.

Toxicity

EPCRA section 313 provides toxicity criteria at section 313(d)(2) to be used to determine whether a chemical should be added or deleted from the EPCRA section 313 list of toxic chemicals. All of the chemicals listed as PBT chemicals, including dioxin and dioxin-like compounds, were either added based on these criteria or were on the initial EPCRA section 313 list provided to EPA by Congress.

TRI DATA FOR PBT CHEMICALS, 2001

As shown in Table 3-1, 15,794 forms were submitted for PBT chemicals in 2001. Over half of these forms were for lead and lead compounds. Almost one-quarter of the forms were for polycyclic aromatic compounds.

On- and Off-site Releases, 2001

In 2001, TRI releases for all PBT chemicals totaled 454.4 million pounds, of which lead and lead compounds accounted for 443.0 million pounds, or 97.5 percent of total releases for all PBT chemicals (see Table 3-1). Over 85 percent of the releases of PBT chemicals were released on-site to land and 12.7 percent were off-site releases (off-site transfers to disposal).

Lead and lead compounds accounted for 360.8 million pounds of the 365.8 million pounds of other on-site land releases (that is, other than to RCRA subtitle C landfills) accounting for 98.6 percent of such releases. Lead and lead compounds accounted for 55.3 million pounds of the 57.8 million pounds of off-site releases (95.6 percent). Lead and lead compounds also accounted for 54.0 percent and polycyclic aromatic compounds for 38.9 percent of the 3.0 million pounds of air emissions for all PBT chemicals.

Table 3-1: TRI On-site and Off-site Releases, PBT Chemicals, 2001

			On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
CAS Number	Chemical	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
--	**Dioxin and dioxin-like compounds***	**1,320**	**6.37**	**4.08**	**0.14**	**0.19**	**21.97**	**94.39**	**127.14**	**200.88**	**328.01**
--	*Dioxin and dioxin-like compounds (in grams)**	*1,320*	*2,887.566*	*1,850.869*	*63.881*	*84.270*	*9,963.843*	*42,807.558*	*57,657.988*	*91,100.805*	*148,758.793*
	Lead and Lead Compounds	**8,561**	**1,633,121.66**	**413,419.80**	**206,138.00**	**6,026,683.34**	**18,610,199.14**	**360,809,675.39**	**387,699,237.33**	**55,292,470.94**	**442,991,708.27**
7439-92-1	Lead	4,201	378,740.71	51,297.37	0.00	6.65	12,623,535.98	2,681,130.01	15,734,710.71	5,079,312.56	20,814,023.27
--	Lead compounds	4,360	1,254,380.94	362,122.44	206,138.00	6,026,676.69	5,986,663.17	358,128,545.38	371,964,526.62	50,213,158.38	422,177,685.00
	Mercury and Mercury Compounds	**1,665**	**150,462.84**	**1,805.15**	**1,741.11**	**8,035.04**	**60,008.84**	**4,455,980.78**	**4,678,033.75**	**228,282.95**	**4,906,316.70**
7439-97-6	Mercury	537	24,698.08	341.73	460.40	0.00	19,861.63	11,899.27	57,261.10	76,715.67	133,976.77
--	Mercury compounds	1,128	125,764.77	1,463.42	1,280.71	8,035.04	40,147.21	4,444,081.51	4,620,772.66	151,567.27	4,772,339.93
	Polycyclic Aromatic Compounds	**3,813**	**1,177,581.28**	**17,069.76**	**2.10**	**332.95**	**97,094.05**	**71,292.51**	**1,363,372.65**	**1,622,784.90**	**2,986,157.55**
191-24-2	Benzo(g,h,i)perylene	1,509	31,455.26	685.17	1.00	1.65	3,716.71	4,852.90	40,712.69	86,240.63	126,953.32
--	Polycyclic aromatic compounds	2,304	1,146,126.02	16,384.58	1.10	331.30	93,377.34	66,439.62	1,322,659.96	1,536,544.27	2,859,204.23
1336-36-3	**Polychlorinated biphenyls (PCBs)**	**137**	**1,359.90**	**2.80**	**0.00**	**0.00**	**2,265,476.30**	**225,685.85**	**2,492,524.85**	**12,251.02**	**2,504,775.86**
	Pesticides	**130**	**6,559.55**	**282.29**	**115.14**	**0.00**	**15,182.57**	**38,277.70**	**60,417.25**	**50,845.10**	**111,262.34**
309-00-2	Aldrin	8	0.31	0.00	0.00	0.00	0.00	0.00	0.31	1.07	1.38
57-74-9	Chlordane	20	15.49	80.00	0.00	0.00	3,630.30	0.00	3,725.79	331.61	4,057.40
76-44-8	Heptachlor	15	6.04	0.00	0.00	0.00	271.69	0.00	277.73	28.24	305.97
465-73-6	Isodrin	5	0.35	0.00	0.00	0.00	19.00	0.00	19.35	441.40	460.75
72-43-5	Methoxychlor	15	25.19	0.00	0.00	0.00	334.69	0.00	359.88	95.93	455.81
40487-42-1	Pendimethalin	18	3,573.66	195.00	0.00	0.00	185.00	28,832.00	32,785.66	46,702.21	79,487.87
8001-35-2	Toxaphene	18	42.34	6.29	0.14	0.00	3,073.89	0.00	3,122.66	854.53	3,977.18
1582-09-8	Trifluralin	31	2,896.17	1.00	115.00	0.00	7,668.00	9,445.70	20,125.87	2,390.11	22,515.98
	Other PBTs	**168**	**55,273.40**	**463.43**	**23.48**	**0.02**	**19,006.97**	**203,735.50**	**278,502.80**	**637,304.07**	**915,806.87**
118-74-1	Hexachlorobenzene	99	1,199.39	321.61	22.00	0.02	18,586.97	4,937.60	25,067.59	11,107.40	36,174.98
29082-74-4	Octachlorostyrene	4	0.00	0.12	0.00	0.00	0.00	193.00	193.12	508.60	701.72
608-93-5	Pentachlorobenzene	17	69.10	132.70	1.48	0.00	420.00	1,929.90	2,553.18	206.32	2,759.50
79-94-7	Tetrabromobisphenol A	48	54,004.91	9.00	0.00	0.00	0.00	196,675.00	250,688.91	625,481.75	876,170.66
	Total	**15,794**	**3,024,365.00**	**433,047.31**	**208,019.97**	**6,035,051.53**	**21,066,989.83**	**365,804,742.12**	**396,572,215.77**	**57,844,139.84**	**454,416,355.61**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

* The chemical category dioxin and dioxin-like compounds is reported in grams. Where the category dioxin and dioxin-like compounds is shown on a table with other TRI chemicals, it is presented in pounds. The grams are converted to pounds by multiplying by 0.002205.

The various PBT chemicals were generally released in different ways in 2001. Over 60 percent of dioxin and dioxin-like compounds were off-site releases (off-site transfers to disposal). Over 80 percent of lead and lead compounds and over 90 percent of mercury and mercury compounds were released on-site to land in sites other than RCRA subtitle C landfills. Polycyclic aromatic compounds were either transferred off-site to disposal (54.3 percent) or released to air (39.4 percent). Practically all of the polychlorinated biphenyls (90.4 percent) were released to on-site RCRA subtitle C landfills. For the group of pesticides, 45.7 percent was transferred off-site to disposal and 34.4 percent was released on-site to land in sites other than RCRA landfills. For the four other PBT chemicals, 69.6 percent of total releases of this group was transferred off-site to disposal.

In 2001, facilities in Alaska reported the largest total on- and off-site releases of PBT chemicals (see Table 3-2). They reported a total of 145.2 million pounds, or 32.0 percent of total releases for all PBT chemicals. Utah accounted for 95.5 million pounds, or 21.0 percent of the total. Facilities in Nevada reported the third largest amount, 42.3 million pounds or 9.3 percent. Missouri accounted for 32.0 million pounds (7.0 percent).

Each of the four states with the largest releases had most of their releases of PBT chemicals as on-site land releases. Such releases in Alaska were 139.2 million pounds or 95.9 percent of the state's total. Utah's on-site land releases were 99.8 percent of the state's total releases, Nevada's were 99.9 percent and Missouri's were 87.5 percent.

New Jersey facilities reported the largest amount of off-site releases (transfers to disposal), with 18.8 million pounds or 32.5 percent of total off-site releases of PBT chemicals in 2001. Off-site releases represented 99.7 percent of total releases of PBT chemicals in New Jersey.

In 2001, metal mining facilities reported the largest total on- and off-site releases of PBT chemicals (see Table 3-3). This industry reported 339.7 million pounds or 74.8 percent of total releases of PBT chemicals. The primary metals industry reported the second largest total releases, with 45.6 million pounds or 10.0 percent of the total for PBT chemicals. The hazardous waste/solvent recovery industries represented another 5.7 percent (26.1 million pounds) of total releases.

The metal mining industry reported almost all of their releases of PBT chemicals in 2001 as on-site releases to land sites other than to RCRA subtitle C landfills, with 333.6 million pounds of such releases or 98.2 percent of the industry's total. The primary metals industry reported the largest off-site releases (transfers to disposal) with 26.1 million pounds, which represented 57.3 percent of the industry's total releases of PBT chemicals. The primary metals industry also had the largest air emissions of any industry sector, with 1.2 million pounds or 40.4 percent of total air emissions of PBT chemicals in 2001. The hazardous waste/solvent recovery industries reported 20.4 million pounds of on-site land releases to RCRA subtitle C landfills, which represented 96.9 percent of all such releases of PBT chemicals.

Waste Management Data, 2001

Quantities of TRI Chemicals in Waste

The total quantity of PBT chemicals managed in production-related waste in 2001 was 1.28 billion pounds, of which lead and lead compounds accounted for 1.23 billion pounds, or 96.4 percent (see Table 3-4). Polycyclic aromatic compounds totaled 25.0 million pounds of production-related waste managed, or 2.0 percent of the total for PBT chemicals.

Almost 43 percent of all PBT chemicals in production-related waste was recycled on-site (546.6 million pounds). Another 34.4 percent was released on- and off-site, and 20.3 percent was recycled off-site.

Lead and lead compounds accounted for 543.7 million pounds (99.5 percent) of the on-site recycling of PBT chemicals, 428.6 million pounds (97.4 percent) of the quantity released on- and off-site, and

Table 3-2: TRI On-site and Off-site Releases by State, PBT Chemicals, 2001

State	Total Forms	On-site Releases							Off-site Releases	Total On- and Off-site Releases
				Underground Injection		On-site Land Releases		Total On-site Releases	Transfers Off-site to Disposal	
		Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases			
	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	422	66,826.07	6,973.12	0.00	6,912.00	1,198,983.00	988,190.09	2,267,884.28	467,746.84	2,735,631.12
Alaska	47	13,202.95	146.64	0.00	6,007,867.00	0.00	139,196,159.40	145,217,375.99	1,196.70	145,218,572.69
American Samoa	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arizona	183	34,640.02	7.01	0.00	0.00	1,736.45	11,209,100.44	11,245,483.92	67,941.63	11,313,425.54
Arkansas	212	86,652.84	1,789.34	0.00	0.00	38,013.70	291,771.57	418,227.45	1,134,099.67	1,552,327.12
California	944	42,990.35	1,298.54	0.00	9.01	5,982,733.85	580,404.15	6,607,435.91	230,816.86	6,838,252.76
Colorado	197	34,016.61	294.50	0.00	0.00	18,137.20	3,876,931.29	3,929,379.60	93,746.48	4,023,126.07
Connecticut	331	21,386.73	607.96	0.00	0.00	0.00	1,350.60	23,345.29	738,723.09	762,068.38
Delaware	64	5,415.08	3,659.34	0.00	0.00	0.00	21,852.08	30,926.50	60,773.06	91,699.56
District of Columbia	6	0.10	0.00	0.00	0.00	0.00	0.00	0.10	958.60	958.70
Florida	473	41,869.24	1,450.24	0.00	0.00	18,260.60	437,565.88	499,145.96	329,178.45	828,324.41
Georgia	386	40,173.15	2,564.59	0.00	0.01	2,275.00	601,223.92	646,236.67	85,030.22	731,266.89
Guam	17	803.65	1.00	0.00	0.00	3.00	5,519.00	6,326.65	0.00	6,326.65
Hawaii	71	6,506.14	277.10	0.00	6.58	0.00	77,022.42	83,812.24	5,288.22	89,100.47
Idaho	61	2,922.21	1,322.39	0.00	0.00	3,509,759.09	3,444,177.95	6,958,181.64	71,774.58	7,029,956.22
Illinois	636	73,382.10	5,510.71	0.00	0.00	1,502,755.10	425,690.34	2,007,338.24	818,550.77	2,825,889.01
Indiana	600	92,728.02	256,492.80	1,300.40	139.90	1,006.00	1,009,721.87	1,361,388.99	3,381,285.65	4,742,674.65
Iowa	242	60,460.95	2,087.01	0.00	0.00	0.00	146,881.87	209,429.82	223,920.33	433,350.15
Kansas	174	36,795.56	50.36	20.14	0.00	0.00	122,094.80	158,960.87	45,407.70	204,368.57
Kentucky	342	114,530.55	8,556.80	0.00	333.50	0.00	1,069,746.15	1,193,167.01	170,931.08	1,364,098.09
Louisiana	316	130,964.86	19,371.84	116.41	0.00	265,607.02	409,903.17	825,963.30	332,631.46	1,158,594.76
Maine	161	6,368.77	1,884.50	0.00	0.00	0.00	6,699.10	14,952.37	297,492.75	312,445.12
Maryland	173	29,931.44	1,130.73	0.00	245.03	0.00	118,761.61	150,068.81	90,915.09	240,983.90
Massachusetts	559	36,155.86	33.31	0.00	0.00	452.02	5,604.43	42,245.62	303,198.67	345,444.29
Michigan	519	87,162.53	5,190.85	2.00	0.00	1,688,858.89	238,604.43	2,019,818.70	1,179,806.05	3,199,624.75
Minnesota	285	24,879.05	807.82	0.00	0.00	0.00	184,054.69	209,741.56	478,554.84	688,296.40
Mississippi	215	16,104.28	1,499.51	189,052.90	0.00	4,312.00	141,954.16	352,922.84	62,917.51	415,840.35
Missouri	333	453,510.13	3,814.01	0.00	0.00	44,271.93	27,919,564.42	28,421,160.49	3,552,753.28	31,973,913.77
Montana	69	11,461.91	382.64	0.00	10,831.00	0.00	14,146,015.10	14,168,690.65	749,182.89	14,917,873.55
Nebraska	109	16,532.33	100.82	0.00	0.00	0.00	84,975.23	101,608.38	47,611.78	149,220.16
Nevada	113	19,588.54	49.00	0.00	0.20	1,344,010.00	40,920,010.20	42,283,657.94	10,546.01	42,294,203.96
New Hampshire	134	615.64	222.12	0.00	0.00	0.00	417.70	1,255.46	50,143.77	51,399.23
New Jersey	362	11,120.64	1,146.05	0.00	1.00	6,242.60	40,933.14	59,443.44	18,776,487.82	18,835,931.25
New Mexico	73	5,678.56	50.70	0.00	0.00	0.00	7,144,392.36	7,150,121.62	39,535.81	7,189,657.43
New York	601	55,829.12	18,146.46	0.00	0.00	7,587.99	130,344.98	211,908.55	367,904.11	579,812.66
North Carolina	542	57,533.43	2,514.90	0.00	0.00	250.00	574,033.96	634,332.29	403,487.75	1,037,820.04
North Dakota	52	10,899.32	452.00	0.00	0.00	0.00	106,042.78	117,394.10	76,802.07	194,196.17
Northern Marianas	9	3.69	0.00	0.00	0.00	0.00	2.10	5.79	0.00	5.79
Ohio	956	518,432.13	6,429.11	15,150.00	0.00	2,243,515.61	812,419.25	3,595,946.09	3,422,815.72	7,018,761.81
Oklahoma	180	18,210.63	309.52	562.00	0.00	484,831.02	33,094.52	537,007.69	169,605.11	706,612.80
Oregon	194	11,335.87	3,176.45	0.00	0.00	1,459,146.58	132,276.57	1,605,935.46	41,983.79	1,647,919.25
Pennsylvania	891	139,904.49	6,528.96	0.00	0.00	243,930.60	911,187.66	1,301,551.71	3,452,147.53	4,753,699.24
Puerto Rico	109	11,132.99	452.30	0.00	0.00	0.00	8,669.50	20,254.79	6,654.84	26,909.64
Rhode Island	110	1,455.32	19.09	0.00	0.00	0.00	0.00	1,474.41	12,149.73	13,624.14
South Carolina	374	120,310.07	1,904.96	0.00	0.00	1,579.00	318,816.16	442,610.19	424,358.34	866,968.54
South Dakota	57	1,823.92	632.54	0.00	8,700.00	0.00	2,986,750.10	2,997,906.56	1,864.03	2,999,770.59
Tennessee	377	71,307.85	6,486.67	0.00	0.00	1,149.00	6,271,641.16	6,350,584.68	779,207.28	7,129,791.96
Texas	962	175,789.44	9,892.60	1,816.12	0.20	358,380.71	1,277,742.02	1,823,621.09	12,666,561.64	14,490,182.73
Utah	140	14,199.31	518.20	0.00	0.00	629,368.00	94,675,720.32	95,319,805.83	136,957.35	95,456,763.18
Vermont	38	580.20	2.00	0.00	0.00	178.00	0.30	760.50	22,721.86	23,482.36
Virgin Islands	18	3,318.03	1.00	0.00	0.00	0.00	103.00	3,422.03	534.00	3,956.03
Virginia	384	56,986.54	5,804.73	0.00	0.00	826.00	368,808.04	432,425.31	571,700.24	1,004,125.55
Washington	277	32,081.74	7,233.01	0.00	6.10	4,731.93	240,891.89	284,944.67	521,143.97	806,088.64
West Virginia	172	43,859.04	28,224.00	0.00	0.00	105.00	1,866,687.55	1,938,875.59	491,693.38	2,430,568.97
Wisconsin	459	47,034.36	4,020.14	0.00	0.00	3,992.95	79,128.64	134,176.09	356,422.37	490,598.46
Wyoming	62	6,960.64	1,525.33	0.00	0.00	0.00	143,088.04	151,574.01	18,277.07	169,851.08
Total	**15,794**	**3,024,365.00**	**433,047.31**	**208,019.97**	**6,035,051.53**	**21,066,989.83**	**365,804,742.12**	**396,572,215.77**	**57,844,139.84**	**454,416,355.61**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Table 3-3: TRI On-site and Off-site Releases by Industry, PBT Chemicals, 2001

			On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
SIC Code	Industry	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
10	Metal Mining	154	156,739.05	3,947.48	0.00	6,027,398.20	0.00	333,552,112.25	339,740,196.98	9,741.35	339,749,938.33
12	Coal Mining	118	114.06	26,256.83	0.00	7,296.93	0.00	1,208,500.67	1,242,168.49	10,830.00	1,252,998.49
20	Food	381	125,700.61	624.00	0.00	0.00	3.50	35,852.21	162,180.32	26,866.03	189,046.35
21	Tobacco	11	260.50	18.10	0.00	0.00	0.00	0.00	278.60	7,461.50	7,740.10
22	Textiles	211	48,548.31	13.22	0.00	0.00	0.00	2,350.57	50,912.10	34,131.71	85,043.81
23	Apparel	2	0.00	0.00	0.00	0.00	0.00	75.00	75.00	0.00	75.00
24	Lumber	599	30,307.19	375.01	0.00	0.00	0.01	38,522.06	69,204.27	32,559.41	101,763.68
25	Furniture	113	4,160.99	476.10	0.00	0.00	0.00	26.69	4,663.78	14,036.57	18,700.35
26	Paper	835	100,872.81	31,318.41	0.00	0.00	9.08	274,065.33	406,265.63	129,263.86	535,529.49
27	Printing	48	5,517.68	0.00	0.00	0.00	0.00	408.00	5,925.68	32,680.22	38,605.90
28	Chemicals	1,266	164,750.87	17,634.83	189,080.95	1.20	10,249.25	1,711,934.29	2,093,651.38	19,412,350.27	21,506,001.65
29	Petroleum	934	184,933.37	9,109.54	76.00	11.11	38.84	13,640.92	207,809.78	295,326.62	503,136.40
30	Plastics	458	36,413.43	253.28	0.00	0.00	7,394.00	7,447.30	51,508.00	365,421.79	416,929.79
31	Leather	7	26.16	0.00	0.00	0.00	0.00	0.00	26.16	0.00	26.16
32	Stone/Clay/Glass	932	197,412.22	479.75	0.00	339.60	400.70	748,917.36	947,549.62	1,330,184.54	2,277,734.16
33	Primary Metals	1,447	1,220,723.60	271,845.20	2,626.40	0.00	507,932.96	17,445,756.78	19,448,884.95	26,102,029.19	45,550,914.14
34	Fabricated Metals	999	30,316.59	2,143.94	0.00	0.00	54,853.00	36,980.43	124,293.96	494,188.57	618,482.53
35	Machinery	337	37,734.79	30.04	0.00	0.00	3.98	3,115.82	40,884.63	81,284.56	122,169.19
36	Electrical Equip.	1,367	93,615.67	2,149.87	0.00	0.00	4,213.36	41,987.02	141,965.92	1,497,409.47	1,639,375.39
37	Transportation Equip.	503	51,552.88	908.61	0.00	0.00	204.78	2,835.36	55,501.63	547,492.07	602,993.70
38	Measure/Photo.	216	21,286.32	1,059.34	0.00	0.00	252.93	577.15	23,175.74	46,233.75	69,409.49
39	Miscellaneous	101	2,807.18	62.97	0.00	0.00	26.00	390.00	3,286.15	27,834.34	31,120.49
--	Multiple codes 20-39	772	110,565.88	12,074.79	0.00	0.01	2,761.75	276,792.34	402,194.77	675,641.70	1,077,836.47
--	No codes 20-39	284	61,179.80	1,690.79	0.00	0.00	3,883.60	2,039,858.44	2,106,612.63	331,269.50	2,437,882.13
491/493	Electric Utilities	2,227	309,270.92	50,011.20	0.00	4.48	50,895.40	7,448,657.20	7,858,839.20	1,624,260.83	9,483,100.03
5169	Chemical Wholesale Distributors	23	23.41	0.00	0.00	0.00	5.00	0.00	28.41	4,310.18	4,338.59
5171	Petroleum Terminals/Bulk Storage	954	14,758.48	194.42	0.00	0.00	3.00	1,277.43	16,233.33	8,083.49	24,316.82
7389/4953	Hazardous Waste/Solvent Recovery	495	14,772.24	369.60	16,236.62	0.00	20,423,858.71	912,661.51	21,367,898.67	4,703,248.33	26,071,147.00
	Total	**15,794**	**3,024,365.00**	**433,047.31**	**208,019.97**	**6,035,051.53**	**21,066,989.83**	**365,804,742.12**	**396,572,215.77**	**57,844,139.84**	**454,416,355.61**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

258.8 million pounds (99.6 percent) of off-site recycling of PBT chemicals in 2001.

Polycyclic aromatic compounds accounted for 95.7 percent (10.4 million pounds) of energy recovery on-site and 40.9 percent (8.2 million pounds) of on-site treatment of PBT chemicals in 2001.

In 2001, facilities in Missouri reported the largest quantities of PBT chemicals in total production-related waste managed (see Table 3-5). Missouri accounted for 14.9 percent (190.3 million pounds) of the total quantity of PBT chemicals managed in production-related waste. Minnesota, the state with the second largest production-related waste of PBT chemicals, reported 148.8 million pounds or 11.6 percent, and Alaska, with the third largest amount, reported 145.0 million pounds or 11.3 percent of total PBT chemicals in production-related waste.

Both Missouri and Minnesota reported most of PBT chemicals contained in production-related waste as recycled on-site. Missouri had 141.2 million pounds recycled on-site, or 74.2 percent of that state's total production-related waste of PBT chemicals. Minnesota reported 145.1 million pounds (97.5 percent of its total) as recycled on-site. Alaska, on the other hand, reported 144.9 million pounds as released on- and off-site. This represented 99.3 percent of Alaska's PBT chemicals in production-related waste and 32.9 percent of total quantity of PBT chemicals released on- and off-site in 2001.

In 2001, the primary metals industry reported the largest quantity of PBT chemicals in production-related waste (see Table 3-6). This industry reported 446.2 million pounds or 34.9 percent of the total PBT chemicals in production related-waste. The

Table 3-4: Quantities of TRI Chemicals in Waste, PBT Chemicals, 2001

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
--	**Dioxin and dioxin-like compounds***	**3.27**	**0.23**	**0.03**	**6.09**	**516.62**	**118.13**	**340.50**	**984.86**	**29.13**
--	*Dioxin and dioxin-like compounds (in grams)**	*1,484.197*	*102.870*	*11.524*	*2,760.403*	*234,296.365*	*53,572.009*	*154,421.201*	*446,648.570*	*13,212.890*
	Lead and Lead Compounds	**543,676,920.880**	**258,775,081.959**	**96,065.614**	**119,025.670**	**1,259,679.530**	**1,002,539.673**	**428,651,479.574**	**1,233,580,792.900**	**18,333,736.003**
7439-92-1	Lead	182,687,811.78	62,367,170.76	8,326.00	11,306.00	1,196,232.44	240,541.13	21,275,297.20	267,786,685.31	289,096.40
--	Lead compounds	360,989,109.10	196,407,911.20	87,739.61	107,719.67	63,447.09	761,998.55	407,376,182.37	965,794,107.59	18,044,639.60
	Mercury and Mercury Compounds	**735,096.829**	**161,542.342**	**77.000**	**1.800**	**10,862.961**	**37,796.802**	**4,873,159.631**	**5,818,537.365**	**16,014.155**
7439-97-6	Mercury	304,798.30	75,943.07	77.00	1.80	30.21	33,619.33	104,363.91	518,833.63	3,447.20
--	Mercury compounds	430,298.53	85,599.27	0.00	0.00	10,832.75	4,177.47	4,768,795.72	5,299,703.74	12,566.96
	Polycyclic aromatic compounds	**2,181,079.520**	**860,183.755**	**10,401,981.016**	**178,811.785**	**8,181,690.388**	**180,866.390**	**3,017,847.935**	**25,002,460.787**	**18,875.049**
191-24-2	Benzo(g,h,i)perylene	140,586.01	37,229.40	808,168.96	3,744.11	199,443.74	1,911.27	122,772.28	1,313,855.78	1,565.82
--	Polycyclic aromatic compounds	2,040,493.51	822,954.35	9,593,812.06	175,067.67	7,982,246.65	178,955.12	2,895,075.65	23,688,605.01	17,309.23
1336-36-3	**Polychlorinated biphenyls (PCBs)**	**355.10**	**121.88**	**400.00**	**54.40**	**1,310,735.30**	**270,767.30**	**2,545,407.33**	**4,127,841.31**	**23,202.59**
	Pesticides	**13,702.00**	**3.00**	**1,996.00**	**2,649.20**	**2,410,597.72**	**115,391.20**	**115,494.02**	**2,659,833.14**	**679.02**
309-00-2	Aldrin	0.00	0.00	0.00	306.00	58,529.00	24.00	18.38	58,877.38	0.00
57-74-9	Chlordane	0.00	0.00	244.00	0.00	463,839.30	457.00	4,024.29	468,564.59	0.00
76-44-8	Heptachlor	0.00	0.00	45.00	334.00	751,861.74	173.00	305.73	752,719.47	0.02
465-73-6	Isodrin	0.00	0.00	0.00	0.00	3,800.00	142.00	465.19	4,407.19	0.00
72-43-5	Methoxychlor	0.00	0.00	569.00	1,376.00	319,545.30	231.40	12,093.69	333,815.39	0.00
40487-42-1	Pendimethalin	6,000.00	0.00	0.00	0.00	390,997.29	34,656.00	71,546.00	503,199.29	0.00
8001-35-2	Toxaphene	0.00	3.00	1,138.00	7.20	124,183.14	464.80	4,378.99	130,175.13	0.00
1582-09-8	Trifluralin	7,702.00	0.00	0.00	626.00	297,841.95	79,243.00	22,661.75	408,074.70	679.00
	Other PBTs	**5,964.10**	**2,525.00**	**370,079.64**	**6,551.30**	**6,810,472.85**	**94,940.38**	**906,015.92**	**8,196,549.19**	**12,384.33**
118-74-1	Hexachlorobenzene	5,400.10	1,432.00	369,749.64	2,132.80	6,269,768.60	41,542.86	48,534.45	6,738,560.45	9,310.49
29082-74-4	Octachlorostyrene	0.00	0.00	0.00	0.00	8.00	0.00	701.72	709.72	0.00
608-93-5	Pentachlorobenzene	8.00	770.00	330.00	1,491.00	445,846.25	1,307.52	2,759.93	452,512.70	3,073.84
79-94-7	Tetrabromobisphenol A	556.00	323.00	0.00	2,927.50	94,850.00	52,090.00	854,019.81	1,004,766.31	0.00
	Total	**546,613,121.70**	**259,799,458.16**	**10,870,599.30**	**307,100.24**	**19,984,555.37**	**1,702,419.87**	**440,109,744.91**	**1,279,386,999.55**	**18,404,920.28**

Note: Data are from Section 8 of Form R.
* The chemical category dioxin and dioxin-like compounds is reported in grams. Where the category dioxin and dioxin-like compounds is shown on a table with other TRI chemicals, it is presented in pounds. The grams are converted to pounds by multiplying by 0.002205.

metal mining industry reported the second largest amount, with 340.2 million pounds or 26.6 percent of the total for PBT chemicals. The electrical equipment industry reported the third largest amount, with 283.4 million pounds or 22.2 percent of the total. These three industries accounted for almost 84 percent of the PBT chemicals in production-related waste in 2001.

The primary metals industry reported 82.7 percent (368.9 million pounds) of its PBT chemicals managed in production-related waste as recycled on-site. This represented 67.5 percent of all PBT chemicals recycled on-site in 2001. The metal mining industry released on- and off-site 336.6 million pounds, accounting for 99.0 percent of its PBT chemicals in production-related waste. This represented 76.5 percent of all PBT chemicals released on- and off-site in 2001. The electrical equipment industry sent 190.9 million pounds off-site to recycling. This accounted for 67.4 percent of its PBT chemicals in production-related waste and for 73.5 percent of all off-site recycling of PBT chemicals in 2001.

Transfers Off-site for Further Waste Management, including Disposal

As shown in Table 3-7, transfers off-site for further waste management, including disposal, totaled 324.8 million pounds for PBT chemicals in 2001. Lead and lead compounds accounted for 320.2 million pounds of the total (98.6 percent).

Almost 79 percent of all transfers for further waste management, including disposal, of PBT chemicals was sent off-site for recycling (256.6 million

Table 3-5: Quantities of TRI Chemicals in Waste by State, PBT Chemicals, 2001

State	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
Alabama	16,909,585.69	4,223,987.87	0.00	2,107.62	32,183.89	86,707.69	2,972,190.68	24,226,763.43	6,755.99
Alaska	34.10	0.00	0.00	98,000.20	1,013.78	1.30	144,915,090.10	145,014,139.48	31.10
American Samoa	0.00	0.00	128.50	0.00	0.00	0.00	0.00	128.50	0.00
Arizona	2,242,815.07	929,143.58	106,979.90	383.00	539,677.08	29,683.50	11,277,287.90	15,125,970.03	1,935.70
Arkansas	1,920,287.75	4,940,430.54	2,972.00	12,172.20	1,085,102.61	74,536.64	2,643,508.92	10,679,010.65	139,624.14
California	13,431,956.74	16,990,183.86	86,587.00	2,190.20	1,174,464.89	140,811.65	7,282,139.51	39,108,333.86	32,370.74
Colorado	73,447.20	3,466,955.64	0.00	8.70	135,814.26	1,583.00	4,092,706.37	7,770,515.17	7,067.75
Connecticut	9,326.92	865,278.45	3,234.10	10.10	12,070.43	13,812.50	759,164.71	1,662,897.20	69,074.91
Delaware	7,800.00	4,570,953.92	210.00	0.00	400.00	0.03	93,038.05	4,672,402.00	118.00
District of Columbia	30.00	4,500.00	0.00	0.00	3.00	0.00	335.00	4,868.00	0.00
Florida	48,579.00	7,046,302.01	22,627.40	146.61	384.07	6,292.96	766,270.24	7,890,602.29	17,692.49
Georgia	1,365,686.45	11,039,862.75	20,714.00	37.76	95.33	9,216.69	743,017.37	13,178,630.35	5,149.11
Guam	0.00	0.00	0.00	0.00	0.00	3.00	6,309.65	6,312.65	17.00
Hawaii	115.00	16,844.28	0.00	0.00	0.00	15.01	132,174.50	149,148.79	1.41
Idaho	4,332.00	453,122.02	0.01	0.00	0.00	1.00	7,049,050.55	7,506,505.58	3,821.59
Illinois	361,593.68	10,509,014.04	0.00	58,445.04	571,932.50	41,388.02	3,518,383.41	15,060,756.69	18,611.11
Indiana	12,633,329.73	11,411,473.63	22,962.00	1,368.80	355,235.08	30,690.52	4,731,180.82	29,186,240.57	46,302.46
Iowa	12,824,054.27	19,075,855.48	6,773.00	738.70	20,140.00	76,798.70	1,010,689.26	33,015,049.41	1,888.55
Kansas	31,544,422.29	8,088,750.75	2,100.00	22.00	85.00	27,968.11	247,587.28	39,910,935.43	12,802.00
Kentucky	5,419,674.90	8,402,827.00	183,938.00	5,212.00	554,762.30	86,480.24	1,349,503.87	16,002,398.31	2,110.33
Louisiana	21,223,326.65	9,339,270.56	1,521,350.00	20,261.00	3,810,219.65	45,023.04	1,180,419.60	37,139,870.50	11,749.39
Maine	0.00	35,541.88	471,782.00	1,036.70	1,094.00	1,215.10	31,592.81	542,262.49	4,047.30
Maryland	338,038.78	290,462.30	611,450.20	0.00	12,483.20	1,789.67	220,901.05	1,475,125.21	11.00
Massachusetts	8,909.92	642,540.96	32,177.22	1,026.12	17,928.00	115,696.21	333,281.02	1,151,559.45	1,251.11
Michigan	1,099,699.40	2,269,234.09	3,073.80	428.30	1,922,063.73	2,483.93	3,172,626.21	8,469,609.47	75.05
Minnesota	145,095,364.75	2,911,163.28	103,081.00	1,021.70	198.33	119.20	658,151.13	148,769,099.38	36,573.76
Mississippi	7,991,803.92	7,962,877.51	144,097.80	3,410.41	51.22	45,394.48	442,086.37	16,589,721.70	16,472.37
Missouri	141,212,569.54	17,056,751.94	185.00	906.00	97,526.00	32,509.10	31,859,652.07	190,260,099.65	19,077.20
Montana	4,654,748.42	212.29	0.00	0.00	136.48	20.70	7,036,279.65	11,691,397.53	5,686,051.77
Nebraska	60.75	316,565.07	0.00	1.13	68,908.00	34,380.57	1,325,923.58	1,745,839.10	0.00
Nevada	1,846,902.62	679,168.71	993,336.00	43.30	289.00	1,526.88	42,282,878.84	45,804,145.35	56.01
New Hampshire	28,740.84	418,021.64	10,085.94	62.10	0.20	1,874.09	41,810.56	500,595.37	27,659.39
New Jersey	42,787.33	3,066,965.35	0.00	129.07	223,006.33	49,961.51	3,261,311.13	6,644,160.73	4,994.74
New Mexico	0.00	116,250.80	234,392.00	0.00	26,128.00	23.84	7,297,200.20	7,673,994.84	14,300.00
New York	6,750,793.61	5,467,802.21	3,993.30	1,172.33	156,716.45	25,838.22	717,470.17	13,123,786.29	57,139.84
North Carolina	156,094.29	20,606,842.63	1,180.37	1,336.87	225,187.83	6,063.75	1,023,058.45	22,019,764.18	4,736.11
North Dakota	0.00	3,646.00	0.00	0.00	0.00	0.00	193,831.73	197,477.73	0.00
Northern Marianas	0.00	0.00	0.00	0.00	0.00	0.00	5.89	5.89	0.00
Ohio	58,940,499.97	11,485,206.69	594.20	25,581.00	1,550,463.74	15,863.29	7,606,151.82	79,624,360.72	12,090.30
Oklahoma	239,370.60	2,016,730.34	141,695.00	360.50	4,283.00	1,600.36	759,974.03	3,164,013.83	12,641.17
Oregon	5,174.24	4,339,373.48	1,983.00	13,901.69	1,509.82	4,280.32	2,350,246.84	6,716,469.39	994.14
Pennsylvania	43,245,469.40	10,735,076.04	305,862.28	388.30	224,065.79	68,557.75	5,730,556.81	60,309,976.38	77,004.87
Puerto Rico	2.00	110,173.42	35,963.00	0.00	1.00	628.42	58,683.66	205,451.50	1.52
Rhode Island	340,100.20	79,896.41	0.01	26.00	24.00	3,009.10	12,567.15	435,622.86	166.90
South Carolina	554,611.51	5,400,752.23	52,055.96	3,403.50	97,245.78	46,386.35	4,927,599.93	11,082,055.27	30,421.29
South Dakota	20.00	788,005.72	0.00	0.00	0.00	1,171.42	3,000,640.76	3,789,837.91	712.00
Tennessee	10,334,524.84	26,789,270.58	3,420,554.20	1,654.60	595,802.85	24,163.89	7,126,342.92	48,292,313.88	1,523.03
Texas	2,867,608.97	4,335,296.64	2,199,635.63	44,108.50	4,863,301.41	532,381.67	14,652,758.21	29,495,091.02	11,012,278.46
Utah	1,351.69	167,259.32	0.00	0.00	971,445.36	1,049.65	94,876,188.14	96,017,294.16	981,784.44
Vermont	636.00	861,055.00	0.00	3.20	0.00	183.90	23,654.66	885,532.76	0.00
Virgin Islands	0.00	131.00	0.00	0.00	0.00	0.00	3,962.03	4,093.03	0.00
Virginia	41,626.70	962,968.97	0.00	3,481.29	64,830.30	862.10	1,004,488.95	2,078,258.32	2,515.53
Washington	93,420.50	1,072,654.16	102,727.70	523.70	489,580.15	4,044.21	877,276.82	2,640,227.25	18,869.89
West Virginia	115,726.90	140,523.86	13.68	0.00	11,782.80	1,265.00	1,525,579.17	1,794,891.41	3,901.00
Wisconsin	586,066.57	7,296,260.26	39.10	1,990.00	63,618.60	6,992.83	529,201.68	8,484,169.04	400.00
Wyoming	0.00	21.00	20,065.00	0.00	1,300.17	68.73	375,762.66	397,217.56	46.33
Total	**546,613,121.70**	**259,799,458.16**	**10,870,599.30**	**307,100.24**	**19,984,555.37**	**1,702,419.87**	**440,109,744.91**	**1,279,386,999.55**	**18,404,920.28**

Note: Data are from Section 8 of Form R.

pounds out of 324.8 million pounds). Another 20.7 percent (67.3 million pounds) was other off-site transfers to disposal.

Transfers to recycling were the major type of transfer for all PBT chemicals primarily because of the 255.5 million pounds of such transfers of lead and lead compounds. Transfers to recycling of lead and lead compounds were 99.6 percent of all transfers

Table 3-6: Quantities of TRI Chemicals in Waste by Industry, PBT Chemicals, 2001

SIC Code	Industry	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
10	Metal Mining	2,680,300.50	738,371.91	0.00	98,029.60	0.00	1,320.60	336,642,813.10	340,160,835.71	444,870.18
12	Coal Mining	0.00	5.00	0.00	0.00	119.00	0.00	1,243,533.95	1,243,657.95	13,978.00
20	Food	0.00	1,442.15	1,128,843.97	0.00	69,749.94	86.00	192,509.44	1,392,631.50	1,511.90
21	Tobacco	0.00	0.00	0.00	0.00	0.00	0.00	7,744.10	7,744.10	0.00
22	Textiles	0.00	3,000.00	34,699.00	871.00	0.00	24,188.42	73,953.18	136,711.60	341.86
23	Apparel	0.00	0.00	0.00	0.00	0.00	0.00	75.00	75.00	0.00
24	Lumber	11,969.78	29,475.51	434,195.20	24,495.34	13,629.94	98,096.01	120,842.50	732,704.29	2,233.07
25	Furniture	0.00	27,298.58	1,153.61	117.28	5.00	77.29	33,050.56	61,702.33	197.00
26	Paper	79.31	10,913.59	46,031.05	98.00	21,929.52	4,120.33	555,595.03	638,766.84	1,529.60
27	Printing	405.00	169,151.46	0.00	1,884.00	0.00	90.13	46,370.53	217,901.11	0.00
28	Chemicals	745,296.32	2,531,321.20	3,576,336.99	73,430.93	5,866,958.81	289,664.47	7,077,945.63	20,160,954.36	25,215.46
29	Petroleum	440,900.70	363,140.34	162,106.80	77,603.44	826,326.92	21,469.85	532,962.39	2,424,510.44	24,645.38
30	Plastics	471,859.15	762,522.30	3,234.00	5,741.80	36,130.00	58,811.47	411,624.11	1,749,922.83	57.60
31	Leather	0.00	0.00	577.00	2.91	0.00	0.00	26.16	606.07	0.00
32	Stone/Clay/Glass	82,217,348.73	1,047,823.94	34,806.40	76.00	1,496.66	91,063.33	2,608,872.28	86,001,487.36	31,599.93
33	Primary Metals	368,925,743.10	28,708,792.91	5,336.00	252.70	2,382,676.07	540,684.25	45,606,088.20	446,169,573.23	17,530,414.70
34	Fabricated Metals	1,684,526.70	10,322,027.57	0.00	2,169.00	1,978.90	72,059.75	583,255.54	12,666,017.45	48,999.07
35	Machinery	284,005.00	2,716,276.31	0.00	2,622.71	2.00	2,619.00	125,456.38	3,130,981.40	5,509.26
36	Electrical Equip.	82,296,436.21	190,886,562.26	3,607,429.24	4,563.08	1,393,154.20	52,475.34	5,137,373.74	283,377,994.07	73,269.85
37	Transportation Equip.	2,973,324.90	3,548,452.80	0.00	51.20	7,979.81	3,732.60	420,430.31	6,953,971.62	7,054.87
38	Measure/Photo.	88,117.00	423,602.75	0.00	28.00	24.08	6,780.70	75,706.25	594,258.77	1,118.39
39	Miscellaneous	11,341.00	83,899.16	0.00	0.00	121.50	3,439.03	23,184.06	121,984.75	20.22
--	Multiple codes 20-39	3,278,323.08	14,611,315.84	105,161.01	1,141.69	64,108.60	34,511.70	1,310,840.41	19,405,402.33	77,136.02
--	No codes 20-39	382,066.00	733,176.44	87,667.22	0.00	4,651.00	44,862.23	2,310,492.43	3,562,915.33	71,074.14
491/493	Electric Utilities	104,723.00	77,051.92	1,639,933.15	652.71	3,264,015.40	19,552.69	8,645,611.90	13,751,540.76	34,524.97
5169	Chemical Wholesale Distributors	0.00	3,925.80	0.00	0.00	0.00	0.22	4,984.05	8,910.07	0.00
5171	Petroleum Terminals/Bulk Storage	516.85	3,291.84	0.01	1,680.65	48.99	2,705.35	19,425.81	27,669.49	1,469.76
7389/4953	Hazardous Waste/Solvent Recovery	15,839.37	1,996,616.58	3,088.64	11,588.19	6,029,449.05	330,009.10	26,298,977.86	34,685,568.78	8,149.05
	Total	**546,613,121.70**	**259,799,458.16**	**10,870,599.30**	**307,100.24**	**19,984,555.37**	**1,702,419.87**	**440,109,744.91**	**1,279,386,999.55**	**18,404,920.28**

Note: Data are from Section 8 of Form R.

to recycling of PBT chemicals in 2001. Similarly, other transfers to disposal of lead and lead compounds were 64.6 million pounds or 96.0 percent of total other transfers to disposal for PBT chemicals.

In 2001, facilities in Tennessee reported the largest amount of PBT chemicals transferred off-site for further waste management, including disposal, with 27.9 million pounds (see Table 3-8). This represented 8.6 percent of the total for all PBT chemicals. New Jersey reported another 21.9 million pounds of transfers off-site of PBT chemicals for further waste management, including disposal, for 6.7 percent of the total. North Carolina and Missouri had the next largest amounts, with 20.8 million pounds and 20.7 million pounds, respectively, representing about 6.4 percent each.

Tennessee reported most of their PBT chemicals transferred off-site for further waste management, including disposal, as transfers to recycling, with 27.1 out of 27.9 million pounds. The 27.1 million pounds of transfers to recycling accounted for 10.6 percent of all transfers to recycling of PBT chemicals in 2001. North Carolina had the next largest amount of transfers to recycling, with 20.3 million pounds or 7.9 percent of the total for such transfers, and Iowa had the third largest, with 19.1 million pounds or 7.4 percent.

New Jersey sent most of its transfers as other off-site transfers to disposal, with 18.8 out of 21.9 million pounds. This represented 28.0 percent of all other off-site transfers to disposal of PBT chemicals. Texas had the second largest amount of other off-site transfers to disposal, with 12.8 million pounds or 19.0 percent of the total of such transfers of PBT chemicals in 2001.

In 2001, the electrical equipment industry had the largest transfers off-site for further waste management, including disposal, of PBT chemicals (see Table 3-9). This industry reported 189.7 million pounds of transfers off-site for further waste man-

Table 3-7: TRI Transfers Off-site for Further Waste Management, including Disposal, PBT Chemicals, 2001

CAS Number	Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs: Metals and Metal Category Compounds Pounds	Transfers to POTWs: Non-metal TRI Chemicals Pounds	Other Off-site Transfers* Pounds	Other Off-site Transfers to Disposal** Pounds	Total Transfers for Further Waste Management, including Disposal Pounds
--	**Dioxin and dioxin-like compounds*** **	**0.26**	**7.16**	**100.92**	**0.00**	**0.17**	**0.00**	**200.91**	**309.42**
--	*Dioxin and dioxin-like compounds (in grams)****	*118.613*	*3,248.079*	*45,767.920*	*0.000*	*76.441*	*0.000*	*91,116.041*	*140,327.093*
	Lead and Lead Compounds	**255,534,760.13**	**7,929.79**	**23,420.48**	**48,948.57**	**0.00**	**14,456.53**	**64,609,428.29**	**320,238,943.78**
7439-92-1	Lead	61,903,264.25	473.99	12,123.68	18,798.10	0.00	9,938.44	6,212,706.53	68,157,304.99
--	Lead compounds	193,631,495.88	7,455.80	11,296.80	30,150.46	0.00	4,518.09	58,396,721.76	252,081,638.79
	Mercury and Mercury Compounds	**160,904.56**	**0.00**	**13.40**	**469.60**	**0.00**	**1,392.00**	**246,408.57**	**409,188.12**
7439-97-6	Mercury	74,756.08	0.00	13.00	103.71	0.00	1,392.00	82,958.66	159,223.45
--	Mercury compounds	86,148.48	0.00	0.40	365.89	0.00	0.00	163,449.91	249,964.67
	Polycyclic aromatic compounds	**917,122.25**	**186,014.86**	**119,571.52**	**0.00**	**6,377.58**	**105.82**	**1,671,426.45**	**2,900,618.49**
191-24-2	Benzo(g,h,i)perylene	37,468.68	3,754.58	1,755.55	0.00	328.62	0.00	86,393.81	129,701.24
--	Polycyclic aromatic compounds	879,653.57	182,260.28	117,815.97	0.00	6,048.97	105.82	1,585,032.64	2,770,917.24
1336-36-3	**Polychlorinated biphenyls (PCBs)**	**927.79**	**19.69**	**316,076.12**	**0.00**	**3.08**	**0.00**	**58,827.72**	**375,854.40**
	Pesticides	**179.00**	**2,648.15**	**127,370.82**	**0.00**	**11.00**	**0.00**	**51,759.94**	**181,968.91**
309-00-2	Aldrin	0.00	306.00	11.00	0.00	0.00	0.00	1.07	318.07
57-74-9	Chlordane	0.00	0.00	425.00	0.00	0.00	0.00	331.61	756.61
76-44-8	Heptachlor	8.00	334.00	116.00	0.00	0.00	0.00	28.24	486.24
465-73-6	Isodrin	2.00	0.00	142.00	0.00	0.00	0.00	443.63	587.63
72-43-5	Methoxychlor	0.00	1,376.00	11,846.00	0.00	0.00	0.00	95.93	13,317.93
40487-42-1	Pendimethalin	0.00	0.00	34,656.00	0.00	0.00	0.00	46,702.21	81,358.21
8001-35-2	Toxaphene	169.00	7.15	200.82	0.00	1.00	0.00	1,090.14	1,468.11
1582-09-8	Trifluralin	0.00	625.00	79,974.00	0.00	10.00	0.00	3,067.11	83,676.11
	Other PBTs	**2,214.02**	**6,603.00**	**82,057.37**	**0.00**	**29.90**	**0.10**	**644,269.81**	**735,174.19**
118-74-1	Hexachlorobenzene	1,432.02	2,132.80	33,376.71	0.00	20.90	0.10	18,073.14	55,035.66
29082-74-4	Octachlorostyrene	0.00	0.00	0.00	0.00	0.00	0.00	508.60	508.60
608-93-5	Pentachlorobenzene	770.00	1,491.00	4,381.36	0.00	0.00	0.00	206.32	6,848.68
79-94-7	Tetrabromobisphenol A	12.00	2,979.20	44,299.30	0.00	9.00	0.00	625,481.75	672,781.25
	Total	**256,616,108.02**	**203,222.65**	**668,610.63**	**49,418.17**	**6,421.73**	**15,954.45**	**67,282,321.67**	**324,842,057.31**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.
*** The chemical category dioxin and dioxin-like compounds is reported in grams. Where the category dioxin and dioxin-like compounds is shown on a table with other TRI chemicals, it is presented in pounds. The grams are converted to pounds by multiplying by 0.002205.

agement, including disposal, which accounted for 58.4 percent of the total transfers off-site for further waste management, including disposal. The primary metals industry had the second largest amounts, with 61.2 million pounds or 18.9 percent of the total. The chemical manufacturing industry was third with 23.3 million pounds or 7.2 percent of the total.

The electrical equipment industry reported most of its transfers off-site for further waste management, including disposal, as transfers to recycling. The 188.1 million pounds of transfers to recycling by the electrical equipment industry represented 99.1 percent of the industry's total transfers off-site for further waste management, including disposal, and represented 73.3 percent of total transfers to recycling of PBT chemicals in 2001.

The primary metals industry reported 33.1 million pounds of other off-site transfers to disposal (54.0 percent of the industry total) and 28.1 million pounds of transfers to recycling (46.0 percent of the industry total). The 33.1 million pounds of other off-site transfers to disposal reported by the primary metals industry was the largest such transfers reported by any industry sector and accounted for 49.1 percent of the total for all PBT chemicals in 2001.

Table 3-8: TRI Transfers Off-site for Further Waste Management, including Disposal, by State, PBT Chemicals, 2001

State	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs: Metals and Metal Category Compounds Pounds	Transfers to POTWs: Non-metal TRI Chemicals Pounds	Other Off-site Transfers* Pounds	Other Off-site Transfers to Disposal** Pounds	Total Transfers for Further Waste Management, including Disposal Pounds
Alabama	4,266,759.33	2,109.09	85,747.13	510.39	4.70	0.00	709,007.41	5,064,138.05
Alaska	0.00	0.30	0.80	1,106.80	0.00	0.00	1,245.20	2,353.10
American Samoa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arizona	932,795.77	345.00	27,617.50	253.26	0.00	0.00	78,711.96	1,039,723.50
Arkansas	4,951,767.58	12,169.10	16,836.60	210.61	54.90	0.00	2,549,787.48	7,530,826.27
California	16,706,184.51	2,756.62	55,423.32	4,157.65	30.21	247.37	841,945.79	17,610,745.46
Colorado	3,592,669.06	8.70	1,572.20	58.42	8.60	0.00	127,996.64	3,722,313.62
Connecticut	835,369.25	10.10	567.81	153.48	0.00	0.00	741,428.93	1,577,529.57
Delaware	4,570,750.92	0.00	0.03	521.37	0.00	0.00	61,681.39	4,632,953.71
District of Columbia	4,511.00	0.00	0.00	0.00	0.00	0.00	958.60	5,469.60
Florida	7,057,008.10	146.59	4,089.58	1,003.64	8.30	250.00	331,978.16	7,394,484.37
Georgia	9,570,120.35	2.76	8,024.10	1,302.44	21.20	0.00	124,117.42	9,703,588.28
Guam	0.00	0.00	3.00	0.00	0.00	0.00	0.00	3.00
Hawaii	16,845.48	0.00	15.01	0.00	0.00	0.00	48,356.22	65,216.71
Idaho	453,054.47	0.00	31,303.00	97.84	0.00	0.00	86,512.44	570,967.75
Illinois	10,536,946.24	58,779.74	3,061.51	2,917.44	66.80	1,020.00	1,505,907.34	12,108,699.07
Indiana	11,227,468.43	786.80	14,095.22	3,621.32	28.22	33.67	3,714,273.19	14,960,306.86
Iowa	19,096,546.49	741.20	76,680.80	1,152.38	0.00	0.00	788,651.96	19,963,772.83
Kansas	8,120,318.92	22.00	26,791.37	163.89	0.03	0.00	94,407.00	8,241,703.21
Kentucky	8,000,414.60	1.00	4,380.54	470.76	6.20	0.00	209,605.85	8,214,878.95
Louisiana	9,338,748.05	20,248.60	51,547.63	702.02	26.40	0.00	340,612.77	9,751,885.47
Maine	41,015.30	1,036.60	20.40	18.94	0.00	0.00	297,928.50	340,019.75
Maryland	287,621.62	0.00	207.97	509.35	1,256.20	800.00	90,676.64	381,071.78
Massachusetts	676,630.14	1,647.12	90,031.74	879.91	0.01	1,500.00	305,693.44	1,076,382.37
Michigan	2,252,402.37	188.24	49.11	3,055.70	96.05	0.00	1,181,372.87	3,437,164.35
Minnesota	2,909,441.60	1,021.70	398.53	1,094.04	10.37	0.00	481,545.22	3,393,511.46
Mississippi	7,961,609.51	3,410.41	3,846.50	646.11	8.20	0.00	67,172.10	8,036,692.83
Missouri	17,085,020.67	902.00	29,528.93	1,527.87	6.38	1,500.00	3,571,072.00	20,689,557.85
Montana	1,076.29	0.00	0.00	4.40	0.00	0.00	792,880.89	793,961.58
Nebraska	313,808.46	1.13	0.37	369.99	0.00	0.00	1,235,241.66	1,549,421.62
Nevada	678,999.81	6.90	139.84	55.75	0.00	2,780.00	14,120.69	696,102.99
New Hampshire	420,649.60	151.80	320.36	125.43	0.00	231.69	50,067.95	471,546.82
New Jersey	3,074,513.01	77.77	2,317.94	390.98	2.80	2,623.10	18,809,116.06	21,889,041.66
New Mexico	116,678.60	0.00	22.00	14.80	0.00	0.00	140,354.75	257,070.15
New York	5,466,370.33	1,419.09	20,164.16	5,777.92	34.48	17.32	449,859.29	5,943,642.59
North Carolina	20,296,189.33	184.01	884.71	353.16	0.00	250.00	499,084.31	20,796,945.51
North Dakota	3,646.00	0.00	30.00	0.00	0.00	0.00	77,164.17	80,840.17
Northern Marianas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ohio	11,494,112.98	24,407.80	10,275.73	3,119.26	69.10	804.00	3,908,210.48	15,440,999.35
Oklahoma	2,016,504.12	357.22	113.30	295.79	1,486.00	0.00	210,559.26	2,229,315.69
Oregon	4,346,075.98	13,904.26	3,757.01	336.84	20.01	0.00	729,733.66	5,093,827.76
Pennsylvania	10,300,737.76	7,580.30	3,691.36	1,824.46	13.50	1,755.30	4,445,176.37	14,760,779.06
Puerto Rico	108,805.42	0.00	511.52	31.90	11.60	1,392.00	13,394.46	124,146.89
Rhode Island	72,051.51	26.00	0.10	56.74	0.00	0.00	12,405.90	84,540.25
South Carolina	5,226,805.83	3.50	3,312.09	1,106.09	2.24	0.00	1,008,236.27	6,239,466.02
South Dakota	788,039.72	0.00	1,170.42	81.50	0.00	0.00	1,783.53	791,075.17
Tennessee	27,120,332.74	767.50	23,459.23	2,386.27	0.27	0.00	795,515.79	27,942,461.80
Texas	3,923,415.48	47,674.50	55,307.34	2,759.62	3,139.86	750.00	12,767,912.61	16,800,959.41
Utah	149,098.93	0.00	899.65	34.79	0.00	0.00	651,053.25	801,086.63
Vermont	861,055.00	3.20	0.00	55.45	0.00	0.00	22,674.14	883,787.79
Virgin Islands	161.00	0.00	0.00	0.00	0.00	0.00	541.00	702.00
Virginia	962,571.49	214.29	561.86	1,562.51	7.50	0.00	572,814.87	1,537,732.52
Washington	1,080,580.10	3.70	5,283.04	125.68	0.00	0.00	608,762.30	1,694,754.83
West Virginia	141,888.86	0.00	456.00	24.39	0.00	0.00	498,789.98	641,159.22
Wisconsin	7,159,898.88	106.00	161.20	2,388.84	1.60	0.00	393,955.34	7,556,511.86
Wyoming	21.00	0.00	3,931.05	0.00	0.00	0.00	220,266.17	224,218.22
Total	**256,616,108.02**	**203,222.65**	**668,610.63**	**49,418.17**	**6,421.73**	**15,954.45**	**67,282,321.67**	**324,842,057.31**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

Table 3-9: TRI Transfers Off-site for Further Waste Management, including Disposal, by Industry, PBT Chemicals, 2001

SIC Code	Industry	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs: Metals and Metal Category Compounds Pounds	Transfers to POTWs: Non-metal TRI Chemicals Pounds	Other Off-site Transfers* Pounds	Other Off-site Transfers to Disposal** Pounds	Total Transfers for Further Waste Management, including Disposal Pounds
10	Metal Mining	737,344.30	29.60	118.70	1,162.10	0.00	0.00	10,876.55	749,531.26
12	Coal Mining	5.00	0.00	0.00	0.00	0.00	0.00	10,830.00	10,835.00
20	Food	1,692.15	525.40	0.00	80.80	10.01	0.00	30,085.73	32,394.09
21	Tobacco	0.00	0.00	0.00	0.00	0.00	0.00	7,461.50	7,461.50
22	Textiles	2,090.30	0.00	16,490.40	362.00	0.00	0.00	33,770.31	52,713.01
23	Apparel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Lumber	35,353.10	31,277.64	44,054.17	465.04	152.76	0.00	32,975.25	144,277.96
25	Furniture	27,641.74	0.00	0.00	5.39	0.00	0.00	27,509.57	55,156.71
26	Paper	28,277.37	98.00	10.11	5,058.16	1,300.01	32.77	125,550.80	160,327.22
27	Printing	171,218.46	0.00	0.00	86.68	0.00	1,020.00	32,593.54	204,918.68
28	Chemicals	2,400,350.31	76,044.33	250,864.32	2,989.73	86.91	0.40	20,585,486.85	23,315,822.85
29	Petroleum	369,054.79	77,720.14	9,114.23	2,347.39	3,240.46	0.00	325,695.05	787,172.07
30	Plastics	855,985.49	2,195.32	1,405.64	782.39	1,495.27	0.00	385,343.51	1,247,207.61
31	Leather	0.00	2.91	0.00	0.00	0.00	0.00	0.00	2.91
32	Stone/Clay/Glass	1,101,445.06	79.00	6,495.19	1,680.17	0.00	0.00	1,636,513.08	2,746,212.50
33	Primary Metals	28,144,878.03	216.30	26,694.50	4,687.30	92.00	231.69	33,059,254.54	61,236,054.37
34	Fabricated Metals	9,996,385.28	12.00	5,049.00	4,433.62	0.00	3,255.00	560,950.43	10,570,085.34
35	Machinery	2,700,429.27	21.78	2,042.00	777.22	0.00	1,500.00	87,990.71	2,792,760.98
36	Electrical Equip.	188,131,068.38	2,468.78	11,087.89	9,597.52	8.00	7,300.00	1,588,214.74	189,749,745.30
37	Transportation Equip.	3,540,187.16	1.10	403.40	6,448.93	0.00	0.00	590,669.48	4,137,710.07
38	Measure/Photo.	433,067.55	31.57	263.18	974.53	0.00	804.00	47,030.38	482,171.21
39	Miscellaneous	151,816.62	0.00	1,960.00	70.24	0.00	800.00	30,528.00	185,174.86
--	Multiple codes 20-39	14,582,925.55	100.70	2,343.81	4,040.86	0.04	226.92	814,924.36	15,404,562.25
--	No codes 20-39	715,871.15	0.00	1,366.88	1,166.11	27.00	783.67	376,237.88	1,095,452.69
491/493	Electric Utilities	139,954.19	653.51	119.92	348.84	3.80	0.00	1,747,222.41	1,888,302.67
5169	Chemical Wholesale Distributors	3,925.80	0.00	0.22	0.00	0.00	0.00	5,012.62	8,938.64
5171	Petroleum Terminals/Bulk Storage	3,519.96	742.73	1,994.75	8.00	1.47	0.00	8,286.93	14,553.84
7389/4953	Hazardous Waste/Solvent Recovery	2,341,621.00	11,001.83	286,732.30	1,845.15	4.00	0.00	5,121,307.43	7,762,511.71
	Total	**256,616,108.02**	**203,222.65**	**668,610.63**	**49,418.17**	**6,421.73**	**15,954.45**	**67,282,321.67**	**324,842,057.31**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

The chemical manufacturing industry reported the second largest other off-site transfers to disposal, with 20.6 million pounds, representing 30.6 percent of total such transfers of PBT chemicals and 88.3 percent of the industry's total transfers off-site for further waste management, including disposal.

Projected Quantities of TRI Chemicals Managed in Waste, 2001-2003

As described in **Waste Management** in Chapter 1, on each Form R that it submits, a facility reports actual quantities of chemicals managed as waste for the current and prior years and projected quantities for the next two years. Overall, projected reductions of all PBT chemicals from 2001 to 2003 were 14.5 percent, with a reduction of 11.7 percent expected from 2001 to 2002 and of 3.1 percent from 2002 to 2003 (as shown in Table 3-10).

Most of the groups of PBT chemicals also projected reductions in the quantities of toxic chemicals in production-related waste to 2002 from their totals in 2001. Reductions of lead and lead compounds in production-related waste were projected to be 11.9 percent from 2001 to 2002. Dioxin and dioxin-like compounds had a projected 9.2 percent reduction and polychlorinated biphenyls a 4.0 percent reduction for the same time period. These three groups of PBT chemicals also projected decreases for the period 2002 to 2003.

For the other groups of PBT chemicals, facilities projected a reduction in total quantities in production-related waste from 2001 to 2002 but projected an increase from 2002 to 2003. Polycyclic aromatic compounds had a projected reduction of 9.7 from 2001 to 2002 but a projected increase of 4.8 percent from 2002 to 2003. Mercury and mercury com-

Table 3-10: Prior Year, Current Year and Projected Quantities of TRI PBT Chemicals in Waste, 2000-2003

CAS Number	Chemical	Total Production-related Waste Managed				Projected Change 2000-2001	Projected Change 2001-2002	Projected Change 2002-2003	Projected Change 2001-2003
		Prior Year 2000	Current Year 2001	Projected 2002	Projected 2003				
		Pounds	Pounds	Pounds	Pounds	Percent	Percent	Percent	Percent
--	**Dioxin and dioxin-like compounds***	**797.23**	**984.86**	**894.74**	**690.30**	**23.5**	**-9.2**	**-22.8**	**-29.9**
--	*Dioxin and dioxin-like compounds (in grams)**	*361,556.062*	*446,648.574*	*405,777.173*	*313,062.009*	*23.5*	*-9.2*	*-22.8*	*-29.9*
	Lead and Lead Compounds	**NA**	**1,233,580,792.90**	**1,086,610,934.28**	**1,050,335,532.66**	**NA**	**-11.9**	**-3.3**	**-14.9**
7439-92-1	Lead	NA	267,786,685.31	310,386,578.51	270,668,351.64	NA	15.9	-12.8	1.1
--	Lead compounds	NA	965,794,107.59	776,224,355.77	779,667,181.02	NA	-19.6	0.4	-19.3
	Mercury and Mercury Compounds	**4,676,152.17**	**5,818,537.36**	**5,505,929.94**	**5,506,247.90**	**24.4**	**-5.4**	**0.01**	**-5.4**
7439-97-6	Mercury	444,776.20	518,833.63	436,680.89	432,392.78	16.7	-15.8	-1.0	-16.7
--	Mercury compounds	4,231,375.97	5,299,703.74	5,069,249.06	5,073,855.12	25.2	-4.3	0.1	-4.3
	Polycyclic Aromatic Compounds	**32,278,777.10**	**25,002,460.79**	**22,582,984.30**	**23,666,013.07**	**-22.5**	**-9.7**	**4.8**	**-5.3**
191-24-2	Benzo(g,h,i)perylene	2,386,402.11	1,313,855.78	1,404,440.86	1,437,140.44	-44.9	6.9	2.3	9.4
--	Polycyclic aromatic compounds	29,892,374.99	23,688,605.01	21,178,543.44	22,228,872.63	-20.8	-10.6	5.0	-6.2
1336-36-3	**Polychlorinated biphenyls (PCBs)**	**11,233,495.33**	**4,127,841.31**	**3,963,565.69**	**3,672,772.06**	**-63.3**	**-4.0**	**-7.3**	**-11.0**
	Pesticides	**2,542,804.01**	**2,659,833.14**	**2,432,319.74**	**2,451,706.27**	**4.6**	**-8.6**	**0.8**	**-7.8**
309-00-2	Aldrin	75,986.17	58,877.38	58,629.41	58,723.41	-22.5	-0.4	0.2	-0.3
57-74-9	Chlordane	852,290.26	468,564.59	384,610.08	385,981.68	-45.0	-17.9	0.4	-17.6
76-44-8	Heptachlor	240,370.48	752,719.47	712,628.80	712,802.81	213.1	-5.3	0.02	-5.3
465-73-6	Isodrin	6,544.89	4,407.19	4,303.20	4,310.21	-32.7	-2.4	0.2	-2.2
72-43-5	Methoxychlor	292,121.57	333,815.39	328,533.16	328,874.29	14.3	-1.6	0.1	-1.5
40487-42-1	Pendimethalin	713,099.02	503,199.29	466,082.29	484,018.29	-29.4	-7.4	3.8	-3.8
8001-35-2	Toxaphene	216,955.38	130,175.13	119,134.49	119,722.87	-40.0	-8.5	0.5	-8.0
1582-09-8	Trifluralin	145,436.24	408,074.70	358,398.31	357,272.71	180.6	-12.2	-0.3	-12.4
	Other PBTs	**4,660,466.15**	**8,196,549.19**	**8,054,495.68**	**8,057,718.59**	**75.9**	**-1.7**	**0.04**	**-1.7**
118-74-1	Hexachlorobenzene	3,739,472.73	6,738,560.45	6,615,919.28	6,616,306.69	80.2	-1.8	0.01	-1.8
29082-74-4	Octachlorostyrene	604.20	709.72	716.00	754.00	17.5	0.9	5.3	6.2
608-93-5	Pentachlorobenzene	120,838.51	452,512.70	452,475.20	453,443.70	274.5	-0.01	0.2	0.2
79-94-7	Tetrabromobisphenol A	799,550.71	1,004,766.31	985,385.20	987,214.20	25.7	-1.9	0.2	-1.7
	Total	**NA**	**1,279,386,999.55**	**1,129,151,124.37**	**1,093,690,680.84**	**NA**	**-11.7**	**-3.1**	**-14.5**

Note: Data from Section 8 of Form R for 2001.
NA: not available. Reporting thresholds for lead and lead compounds were lowered for 2001, therefore, facilities reporting for the first time for 2001 may not have reported an amount for 2000.
* The chemical category dioxin and dioxin-like compounds is reported in grams. Where the category dioxin and dioxin-like compounds is shown on a table with other TRI chemicals, it is presented in pounds. The grams are converted to pounds by multiplying by 0.002205.

pounds had a projected reduction of 5.4 percent from 2001 to 2002 and a slight projected increase from 2002 to 2003, mainly in mercury compounds. Similarly, the group of four other PBTs had a projected decrease of 1.7 percent from 2001 to 2002 and a slight projected increase from 2002 to 2003. For the group of pesticides, each of the eight pesticides had a projected reduction from 2001 to 2002 for an overall reduction of 8.6 percent for the group. For the period 2002 to 2003, however, all but trifluralin had a projected increase.

The projected decreases from 2001 to 2002 came after actual increases in most of the groups of PBT chemicals. Quantities of dioxin and dioxin-like compounds in production-related waste increased by 23.5 percent from 2000 to 2001, mercury and mercury compounds increased by 24.4 percent and the group of four other PBT chemicals increased by 75.9 percent. While the group of eight pesticides increased overall by 4.6 percent from 2000 to 2001, most of the individual pesticides reported a decrease. Heptachlor was the pesticide showing the largest increase from 2000 to 2001, with an increase of over 200 percent, from 240,370 pounds to 752,719 pounds.

Both polycyclic aromatic compounds and polychlorinated biphenyls had reported decreases from 2000 to 2001, with reductions of 22.5 percent and 63.3 percent, respectively. The change from 2000 to 2001 for lead and lead compounds is not available because the reporting thresholds for these chemicals were lowered for 2001 and, therefore, facilities reporting on lead and lead compounds for the first

time in 2001 may not have reported an amount for 2000 on the 2001 TRI Form R.

TRI FEDERAL FACILITIES' DATA FOR PBT CHEMICALS, 2001

As is shown in Table 3-11, federal facilities reported on PBT chemicals on 312 forms for 2001. Federally owned facilities that are operated by federal agencies or contractors are required to report to TRI, regardless of SIC code, pursuant to Executive Order 13148.

On- and Off-site Releases, 2001

Federal facilities reported releases on- and off-site of PBT chemicals totaling 3.3 million pounds in 2001 (see Table 3-11). The bulk of the releases, 2.9 million pounds, occurred on-site. Most of the on-site releases were as other on-site land releases (that is, other than to RCRA subtitle C landfills). Such releases totaled 2.8 million pounds or 84.0 percent of total releases of PBT chemicals reported by federal facilities. Off-site releases (transfers to disposal) of PBT chemicals reported by federal facilities totaled 440,908 pounds.

Department of Defense agencies reported 2.1 million pounds of on- and off-site releases, with the Army reporting 1.3 million pounds of this. The Army's total represented 40.0 percent of total releases of PBT chemicals for all federal facilities in 2001. It included mostly on-site land releases to sites other than RCRA subtitle C landfills (1.26 million pounds or 94.9 percent of the Army's total of 1.33 million pounds). The Army also reported the largest air emissions, with 51,656 pounds or 64.7 percent of total air emissions of PBT chemicals reported by federal facilities.

Tennessee Valley Authority (TVA) facilities reported the second largest total releases of PBT chemicals reported by federal facilities, with 786,576 pounds or 23.7 percent of the total for 2001. Over 94.5 percent of the TVA's total releases of PBT chemicals were as other on-site land releases (that is, other than to RCRA subtitle C landfills).

The Marines reported the third largest total releases of PBT chemicals, with 436,013 pounds. Most of this (429,682 pounds or 98.5 percent) was other on-site land releases (that is, other than to RCRA subtitle C landfills).

Table 3-11: TRI On-site and Off-site Releases of PBT Chemicals by Agency, 2001: Federal Facilities

		On-site Releases							Off-site Releases	Total On- and Off-site Releases
				Underground Injection		On-site Land Releases				
Federal Agency	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	
	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Department of Defense	172	62,819.34	1,017.19	0.00	0.00	0.00	1,859,556.69	1,923,393.21	145,500.91	2,068,894.12
Air Force	32	3,101.41	120.14	0.00	0.00	0.00	109,319.90	112,541.45	5,042.30	117,583.75
Army	84	51,656.49	256.68	0.00	0.00	0.00	1,259,994.79	1,311,907.95	15,823.06	1,327,731.01
Marines	20	6,043.60	0.00	0.00	0.00	0.00	429,681.80	435,725.40	287.94	436,013.34
Military Academy	2	84.00	0.00	0.00	0.00	0.00	7,760.00	7,844.00	0.00	7,844.00
Navy	34	1,933.84	640.37	0.00	0.00	0.00	52,800.20	55,374.41	124,347.61	179,722.02
Department of Energy	27	3,663.06	1,521.59	0.00	0.00	3,880.00	57,142.73	66,207.37	247,612.32	313,819.70
Department of Interior	10	1.00	310.00	0.00	0.00	0.00	23,258.30	23,569.30	0.00	23,569.30
Department of Transportation	11	227.26	1.70	0.00	0.00	0.00	6,222.00	6,450.96	2,526.72	8,977.68
Department of Treasury	13	64.04	0.00	0.00	0.00	0.00	91,608.00	91,672.04	15,893.62	107,565.66
Department of Veterans Affairs	1	3,436.00	0.00	0.00	0.00	0.00	0.00	3,436.00	0.00	3,436.00
Environmental Protection Agency	8	0.00	296.00	0.00	0.00	0.00	2,971.00	3,267.00	0.00	3,267.00
Environmental Protection Agency	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
US EPA Fund-Lead Superfund Sites	2	0.00	296.00	0.00	0.00	0.00	2,971.00	3,267.00	0.00	3,267.00
National Aeronautics and Space Administration	5	3.76	0.00	0.00	0.00	3.60	4,632.00	4,639.36	3.88	4,643.25
Tennessee Valley Authority	62	9,621.44	4,241.00	0.00	0.00	0.00	743,345.02	757,207.46	29,368.30	786,575.75
US Department of Agriculture	1	1.00	0.00	0.00	0.00	0.00	1,237.00	1,238.00	0.00	1,238.00
US Enrichment Corporation	1	23.00	0.00	0.00	0.00	0.00	570.00	593.00	0.00	593.00
US Government Services Administration	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.70	2.70
Total	**312**	**79,859.90**	**7,387.48**	**0.00**	**0.00**	**3,883.60**	**2,790,542.74**	**2,881,673.71**	**440,908.45**	**3,322,582.16**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Department of Energy facilities reported the largest off-site releases (transfers to disposal), with 247,612 pounds. This accounted for 56.2 percent of off-site releases of PBT chemicals reported by federal facilities in 2001.

Waste Management Data, 2001

Quantities of TRI Chemicals in Waste

Federal facilities reported managing almost 5.0 million pounds of PBT chemicals in waste in 2001 (see Table 3-12). The largest waste management types reported by federal facilities were quantities released on- and off-site (3.2 million pounds) and recycled off-site (1.3 million pounds). The quantities released on- and off-site accounted for 64.8 percent of total production-related waste of PBT chemicals for federal facilities and off-site recycling for 26.1 percent of the total.

Department of Defense agencies reported the largest amounts of PBT chemicals in production-related waste, with 2.7 million pounds or 55.0 percent of the total for federal facilities in 2001. The Army accounted for 1.7 million pounds of this or 34.4 percent of the total for federal facilities. Over three-quarters (78.6 percent) of the Army's total PBT chemicals in production-related waste was released on- and off-site. The 1.3 million pounds released on- and off-site by Army facilities accounted for 41.7 percent of all releases on- and off-site of PBT chemicals reported by federal facilities in 2001.

Department of Energy facilities reported the second largest amount of PBT chemicals in production-related waste for 2001, with 1.2 million pounds. Department of Energy facilities reported the largest amount of PBT chemicals recycled off-site of all federal facilities, with 693,938 pounds, accounting for 53.7 percent of the total recycled off-site for all federal facilities.

Tennessee Valley Authority (TVA) facilities reported the third largest amount of PBT chemicals in production-related waste for 2001. The TVA facilities reported a total of 783,427 pounds, with 783,058 pounds (over 99.9 percent) released on- and off-site.

Transfers Off-site for Further Waste Management, including Disposal

Federal facilities reported 1.7 million pounds of PBT chemicals transferred off-site for further waste management, including disposal, of PBT chemicals in 2001 (see Table 3-13). Over 70 percent of these

Table 3-12: Quantities of TRI PBT Chemicals in Waste by Agency, 2001: Federal Facilities

Federal Agency	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
	On-site	Off-site	On-site	Off-site	On-site	Off-site			
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Department of Defense	124,350.00	480,375.40	86,586.00	0.00	9,324.00	39,525.44	1,986,320.95	2,726,481.79	96,990.94
Air Force	0.00	57,443.00	0.00	0.00	4.00	0.00	117,911.13	175,358.13	0.00
Army	1,140.00	347,973.90	0.00	0.00	9,320.00	6,053.60	1,338,793.08	1,703,280.58	77,699.00
Marines	0.00	1,760.00	86,586.00	0.00	0.00	0.00	392,183.40	480,529.40	1,614.10
Military Academy	0.00	0.00	0.00	0.00	0.00	0.00	7,844.00	7,844.00	0.00
Navy	123,210.00	73,198.50	0.00	0.00	0.00	33,471.84	129,589.34	359,469.68	17,677.84
Department of Energy	165,941.51	693,938.18	0.00	0.00	26,521.00	41.00	326,043.27	1,212,484.96	31,928.29
Department of Interior	0.00	0.00	0.00	0.00	0.00	0.00	3,607.30	3,607.30	0.00
Department of Transportation	0.00	16,630.00	0.00	0.00	0.00	21.00	10,628.58	27,279.58	1,539.00
Department of Treasury	30.00	96,698.00	0.00	0.00	3.00	0.00	92,002.27	188,733.27	19.39
Department of Veterans Affairs	0.00	0.00	0.00	0.00	0.00	0.00	3,436.00	3,436.00	0.00
Environmental Protection Agency	0.00	0.00	0.00	0.00	0.00	317.63	0.00	317.63	4,337.00
Environmental Protection Agency	0.00	0.00	0.00	0.00	0.00	317.63	0.00	317.63	0.00
US EPA Fund-Lead Superfund Sites	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,337.00
National Aeronautics and Space Administration	0.00	351.00	0.00	0.00	0.00	0.00	4,706.84	5,057.84	1.00
Tennessee Valley Authority	0.00	369.10	0.00	0.00	0.00	0.00	783,057.65	783,426.75	0.00
US Department of Agriculture	0.00	31.00	0.00	0.00	0.00	0.00	1,237.00	1,268.00	0.00
US Enrichment Corporation	0.00	0.00	0.00	0.00	0.00	0.00	570.00	570.00	0.00
US Government Services Administration	0.00	4,500.00	0.00	0.00	0.00	0.00	3.00	4,503.00	0.00
Total	**290,321.51**	**1,292,892.68**	**86,586.00**	**0.00**	**35,848.00**	**39,905.07**	**3,211,612.86**	**4,957,166.12**	**134,815.62**

Note: Data are from Section 8 of Form R.

Table 3-13: TRI Transfers Off-site for Further Waste Management, including Disposal, of PBT Chemicals by Agency, 2001: Federal Facilities

Federal Agency	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs: Metals and Metal Category Compounds Pounds	Transfers to POTWs: Non-metal TRI Chemicals Pounds	Other Off-site Transfers* Pounds	Other Off-site Transfers to Disposal** Pounds	Total Transfers for Further Waste Management, including Disposal Pounds
Department of Defense	478,878.40	0.00	28.00	168.29	0.00	0.00	189,992.15	669,066.84
Air Force	57,628.00	0.00	0.00	13.20	0.00	0.00	5,448.10	63,089.30
Army	346,285.90	0.00	28.00	21.00	0.00	0.00	16,317.30	362,652.20
Marines	1,760.00	0.00	0.00	0.00	0.00	0.00	43,385.00	45,145.00
Military Academy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navy	73,204.50	0.00	0.00	134.09	0.00	0.00	124,841.75	198,180.34
Department of Energy	562,078.99	0.00	41.09	13.22	0.00	0.00	253,023.48	815,156.78
Department of Interior	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Department of Transportation	16,630.62	0.00	0.00	0.00	0.00	0.00	3,681.72	20,312.34
Department of Treasury	96,709.00	0.00	0.00	0.23	0.00	0.00	15,893.39	112,602.62
Department of Veterans Affairs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Environmental Protection Agency	62.75	0.00	1,323.88	0.00	0.00	0.00	0.00	1,386.63
Environmental Protection Agency	62.75	0.00	254.88	0.00	0.00	0.00	0.00	317.63
US EPA Fund-Lead Superfund Sites	0.00	0.00	1,069.00	0.00	0.00	0.00	0.00	1,069.00
National Aeronautics and Space Administration	351.00	0.00	0.00	0.00	0.00	0.00	36.88	387.88
Tennessee Valley Authority	557.20	1.90	0.00	0.00	0.00	0.00	29,658.30	30,217.40
US Department of Agriculture	31.00	0.00	0.00	0.00	0.00	0.00	0.00	31.00
US Enrichment Corporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
US Government Services Administration	4,500.00	0.00	0.00	0.00	0.00	0.00	2.70	4,502.70
Total	**1,159,798.96**	**1.90**	**1,392.97**	**181.74**	**0.00**	**0.00**	**492,288.60**	**1,653,664.18**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

transfers were to recycling (1.2 million pounds) and 29.8 percent were other off-site transfers to disposal.

Department of Energy (DOE) facilities reported the largest amount of transfers off-site for further waste management, including disposal, of PBT chemicals among federal agencies. DOE facilities reported 815,157 pounds of total transfers, representing 49.3 percent of all such transfers.

Department of Defense (DOD) agencies reported the second largest amount, with 669,067 pounds of PBT chemicals transferred off-site for further waste management, including disposal in 2001, accounting for 40.5 percent of all such transfers reported by federal facilities. Over half of the DOD amount was reported by the Army, which accounted for 362,652 pounds or 21.9 percent of all such transfers reported by federal facilities. The Navy reported 198,180 pounds or 12.0 percent of the total.

DOE facilities reported the largest amount of transfers to recycling of all federal agencies, with 562,079 pounds or 48.5 percent of all transfers to recycling of PBT chemicals reported by federal facilities in 2001. The Army reported 346,286 pounds of transfers to recycling, accounting for 29.9 percent of all such transfers to recycling.

DOE facilities also reported the largest other off-site transfers to disposal, with 253,023 pounds or 51.4 percent of all such transfers reported by federal facilities. The Navy reported the second largest amount of other off-site transfers to disposal, with 124,842 pounds or 25.4 percent of the total of such transfers.

TRI DATA FOR PBT CHEMICALS, 2000-2001

Comparisons of TRI data for PBT chemicals from 2000 to 2001 do not include data on lead and lead compounds because lower reporting thresholds for these chemicals only became effective for 2001. Therefore, some facilities reporting on lead and lead compounds for 2001 may not have had to report for 2000.

On- and Off-site Releases, 2000-2001

On- and off-site releases of PBT chemicals decreased from 11.6 million pounds to 11.4 million pounds from 2000 to 2001, a decrease of 1.7 percent (see Table 3-14). Off-site releases (transfers to disposal) of PBT chemicals decreased by 43.9 percent or 2.0 million pounds. This was largely due to a decrease of transfers off-site to landfills/surface impoundments of 1.6 million pounds or 41.0 percent. Transfers off-site for solidification/stabilization of metals and metal category compounds also decreased, by 347,076 pounds or 83.6 percent.

On the other hand, total on-site releases of PBT chemicals increased, by 1.8 million pounds or 25.3 percent, from 2000 to 2001. This was due to an increase in other on-site land releases (that is, other than to RCRA subtitle C landfills) of 1.4 million pounds or 39.1 percent. Releases to RCRA subtitle C landfills also increased, by 747,711 pounds or 43.7 percent. Other types of on-site releases showed decreases, including air emissions which decreased by 355,196 pounds or 20.3 percent.

Table 3-14: TRI On-site and Off-site Releases, PBT Chemicals, 2000-2001

	2000	2001	Change 2000-2001	
	Number	Number	Number	Percent
Forms	7,092	7,233	141	2.0
On-site Releases	**Pounds**	**Pounds**	**Pounds**	**Percent**
Total Air Emissions	1,746,439.21	1,391,243.35	-355,195.86	-20.3
Surface Water Discharges	21,437.42	19,627.51	-1,809.91	-8.4
Underground Injection	11,778.46	10,250.16	-1,528.31	-13.0
Class I Wells	1,996.38	1,881.97	-114.41	-5.7
Class II-V Wells	9,782.09	8,368.19	-1,413.90	-14.5
On-site Land Releases	5,300,098.18	7,451,857.42	2,151,759.24	40.6
RCRA Subtitle C Landfills	1,709,080.04	2,456,790.69	747,710.65	43.7
Other On-site Land Releases	3,591,018.14	4,995,066.73	1,404,048.59	39.1
Total On-site Releases	**7,079,753.28**	**8,872,978.44**	**1,793,225.16**	**25.3**
Storage Only*	17,119.66	11,352.22	-5,767.44	-33.7
Solidification/Stabilization**	415,330.48	68,254.65	-347,075.83	-83.6
Metals and Metal Category Compounds Only				
Wastewater Treatment (Excluding POTWs)***	6,850.32	2,679.38	-4,170.94	-60.9
Metals and Metal Category Compounds Only				
Transfers to POTWs****	413.09	469.60	56.51	13.7
Metals and Metal Category Compounds Only				
Underground Injection	0.00	1,305.63	1,305.63	--
Landfills/Surface Impoundments	3,785,264.99	2,232,285.81	-1,552,979.18	-41.0
Land Treatment	881.67	903.36	21.69	2.5
Other Land Disposal	115,965.59	100,282.88	-15,682.70	-13.5
Other Off-site Management	9,368.47	10,099.63	731.16	7.8
Transfers to Waste Broker for Disposal	80,898.95	100,078.16	19,179.21	23.7
Unknown*****	115,370.88	23,957.58	-91,413.30	-79.2
Total Off-site Releases	**4,547,464.09**	**2,551,668.90**	**-1,995,795.19**	**-43.9**
(Transfers Off-site to Disposal)				
Total On- and Off-site Releases	**11,627,217.37**	**11,424,647.34**	**-202,570.03**	**-1.7**

Note: Does not include lead and lead compounds. **On-site Releases** are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

* Storage only (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to storage only are included as a form of disposal (off-site release). See Box 1-5.

** Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal cateogry compounds (waste treatment code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste treatment code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 1-6. Reports under code M40 of metals and metal category compounds have been included in solidification/stabilization of metals and metal cateogry compounds in this report.

*** Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal category compounds (waste treatment code M61) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste treatment code M60). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 1-6. Transfers of metals and metal category compounds reported under code M60 have been included in transfers of metals and metal category compounds to wastewater treatment.

**** Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal category compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

***** Unknown (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as unknown transfers are treated as a form of disposal (off-site release).

Table 3-15: Quantities of TRI Chemicals in Waste by Waste Management Activity, PBT Chemicals, 2000-2001

Waste Management Activity	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Recycled On-site	3,357,805.13	2,936,200.82	-421,604.31	-12.6
Recycled Off-site	808,849.21	1,024,376.20	215,527.00	26.6
Energy Recovery On-site	10,461,080.13	10,774,533.68	313,453.55	3.0
Energy Recovery Off-site	282,609.72	188,074.57	-94,535.15	-33.5
Treated On-site	31,571,703.51	18,724,875.84	-12,846,827.67	-40.7
Treated Off-site	845,698.24	699,880.20	-145,818.04	-17.2
Quantity Released On- and Off-site	11,533,883.15	11,458,265.33	-75,617.81	-0.7
Total Production-related Waste Managed	**58,861,629.10**	**45,806,206.65**	**-13,055,422.45**	**-22.2**
Non-production-related Waste Managed	128,173.87	71,184.28	-56,989.59	-44.5

Note: Does not include lead and lead compounds. Data are from Section 8 of Form R of year indicated.

Waste Management Data, 2000-2001

Quantities of TRI Chemicals in Waste, 2000-2001

Total production-related waste of PBT chemicals managed decreased from 58.9 million pounds in 2000 to 45.8 million pounds in 2001, a decrease of 22.2 percent (see Table 3-15). The amount treated on-site decreased by 12.8 million pounds or 40.7 percent. The amount recycled on-site decreased by 421,604 pounds (12.6 percent), and the amount treated off-site decreased by 145,818 pounds (17.2 percent). The amount used for energy recovery off-site and the quantity released on- and off-site each decreased by less than 100,000 pounds.

Increases from 2000 to 2001 were reported in the amount of PBT chemicals in waste used for energy recovery on-site and recycled off-site. An increase of 313,454 pounds or 3.0 percent was reported for PBT chemicals in waste used for energy recovery on-site, and the amount in waste recycled off-site increased by 215,527 pounds or 26.6 percent from 2000 to 2001.

Transfers Off-site for Further Waste Management, including Disposal, 2000-2001

As shown in Table 3-16, transfers off-site for further waste management, including disposal, of all PBT chemicals decreased from 2000 to 2001, by 2.15 million pounds or 31.8 percent. This was due primarily to a 2.13 million pound decrease in other off-site transfers to disposal. Such transfers decreased by 44.4 percent. Transfers to treatment of PBT chemicals also decreased from 2000 to 2001, by 183,518 pounds or 22.1 percent, and transfers to energy recovery decreased by 88,295 pounds or 31.1 percent.

Increases were reported in the amount of PBT chemicals in transfers to recycling. Such transfers increased by 257,051 pounds or 31.2 percent. Transfers to POTWs of PBT chemicals also

Table 3-16: TRI Transfers Off-site for Further Waste Management, including Disposal, PBT Chemicals, 2000-2001

	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Transfers to Recycling	824,296.58	1,081,347.89	257,051.30	31.2
Transfers to Energy Recovery	283,588.28	195,292.86	-88,295.42	-31.1
Transfers to Treatment	828,708.36	645,190.15	-183,518.21	-22.1
Transfers to POTWs	5,798.26	6,891.33	1,093.07	18.9
Metals and Metal Category Compounds Only	413.09	469.60	56.51	13.7
Non-metal TRI Chemicals	5,385.17	6,421.73	1,036.56	19.2
Other Off-site Transfers*	12.00	1,497.92	1,485.92	12,382.7
Other Off-site Transfers to Disposal**	4,807,181.32	2,672,893.39	-2,134,287.94	-44.4
Total Transfers for Further Waste Management, including Disposal	**6,749,584.80**	**4,603,113.53**	**-2,146,471.27**	**-31.8**

Note: Does not include lead and lead compounds. **Transfers Off-site for Further Waste Management, including Disposal a**re from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

Table 3-17: TRI Total Releases of PBT Chemicals by Agency, 2000-2001: Federal Facilities

Federal Agency	Total On- and Off-site Releases			
	2000	2001	Change 2000-2001	
	Pounds	Pounds	Pounds	Percent
Department of Defense	262.50	33,627.01	33,364.51	12,710.1
Air Force	39.34	20.75	-18.60	-47.3
Army	209.81	279.71	69.90	33.3
Navy	13.35	33,326.56	33,313.21	249,606.3
Department of Energy	3,909.97	1,636.99	-2,272.98	-58.1
Department of Transportation	68.34	0.09	-68.25	-99.9
Department of Veterans Affairs	3,653.00	3,436.00	-217.00	-5.9
Environmental Protection Agency	0.00	0.00	0.00	--
Environmental Protection Agency	0.00	0.00	0.00	--
US EPA Fund-Lead Superfund Sites	0.00	0.00	0.00	--
Tennessee Valley Authority	8,082.99	11,339.31	3,256.32	40.3
US Enrichment Corporation	11.20	0.00	-11.20	-100.0
Total for Federal Facilities	**15,988.00**	**50,039.40**	**34,051.40**	**213.0**

Note: Does not include lead and lead compounds. **On-site Releases** are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI facilities that reported the amount as an on-site release.

increased from 2000 to 2001, by 1,093 pounds or 18.9 percent.

TRI FEDERAL FACILITIES' DATA FOR PBT CHEMICALS, 2000-2001

Comparisons of TRI data for PBT chemicals from 2000 to 2001 do not include data on lead and lead compounds because lower reporting thresholds for these chemicals only became effective for 2001.

On- and Off-site Releases, 2000-2001

From 2000 to 2001, on- and off-site releases of PBT chemicals reported by federal agencies increased by over 200 percent, from 15,988 pounds to 50,039 pounds (see Table 3-17). Most of the increase was due to the increase of 33,313 pounds reported by Navy facilities. Tennessee Valley Authority facilities also reported an increase, of 40.3 percent or 3,256 pounds. The Army also had an increase of almost 70 pounds.

Other federal agencies reported decreases in PBT chemicals from 2000 to 2001. The Department of Energy facilities reported a decrease of 58.1 percent, or 2,273 pounds.

Waste Management Data, 2000-2001

Quantities of TRI Chemicals in Waste, 2000-2001

Total production-related waste of PBT chemicals managed by federal facilities increased from 26,976 pounds to 78,925 pounds from 2000 to 2001 (see Table 3-18). This represented an almost 200 percent

Table 3-18: TRI Total Production-related Waste Managed of PBT Chemicals by Agency, 2000-2001: Federal Facilities

Federal Agency	Total Production-related Waste Managed			
	2000	2001	Change 2000-2001	
	Pounds	Pounds	Pounds	Percent
Department of Defense	540.62	33,809.13	33,268.51	6,153.8
Air Force	39.48	20.73	-18.75	-47.5
Army	357.33	436.01	78.68	22.0
Navy	143.81	33,352.39	33,208.59	23,092.6
Department of Energy	14,134.31	29,376.52	15,242.21	107.8
Department of Transportation	195.73	0.09	-195.64	-99.95
Department of Veterans Affairs	3,653.00	3,436.00	-217.00	-5.9
Environmental Protection Agency	324.90	317.63	-7.27	-2.2
Environmental Protection Agency	324.90	317.63	-7.27	-2.2
US EPA Fund-Lead Superfund Sites	0.00	0.00	0.00	--
Tennessee Valley Authority	8,116.33	11,985.35	3,869.02	47.7
US Enrichment Corporation	11.20	0.00	-11.20	-100.0
Total for Federal Facilities	**26,976.09**	**78,924.72**	**51,948.63**	**192.6**

Note: Does not include lead and lead compounds. Data are from Section 8 of Form R of year indicated.

increase. Most of the increase came from Navy facilities, which reported increases of PBT chemicals of 33,209 pounds, after reporting 144 pounds of PBT chemicals in waste in 2000. Department of Energy (DOE) facilities also reported increases, of 15,242 pounds. From 2000 to 2001, DOE facilities more than doubled the amount of PBT chemicals in waste managed by these facilities. Tennessee Valley Authority facilities reported increases of 47.7 percent, from 8,116 pounds to 11,985 pounds.

PBT chemicals in waste managed by most other federal agencies decreased from 2000 to 2001. The Department of Veterans Affairs reported a decrease of 217 pounds, or 5.9 percent. The Department of Transportation reported a decrease of 196 pounds, or over 99.9 percent.

Dioxin and Dioxin-like Compounds

INTRODUCTION

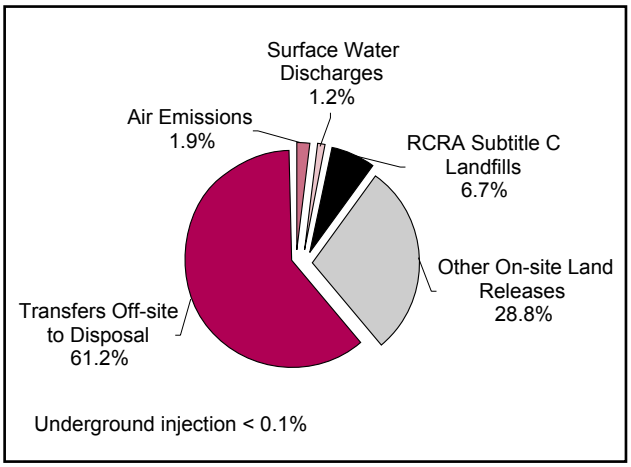
"Dioxins" refers to a group of chemical compounds that share similar chemical and biological properties. These toxic compounds are members of closely related families: the chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs). There are 75 congeners, or related individual compounds, of CDDs and 135 congeners of CDFs (EPA, OEI, September 1999). Of these 210 congeners, seven CDD congeners and ten CDF congeners are thought to exhibit some degree of toxicity. These 17 toxic congeners all have four chlorine atoms attached to the main dioxin or furan molecule in the 2, 3, 7, and 8 positions. The TRI category, dioxin and dioxin-like compounds, includes these 17 dioxins and furans.

Although similar in other ways all dioxin-like compounds do not have the same level of toxicity. As a result, a toxicity equivalency procedure was developed to quantify the toxicity of these compounds relative to each other for risk assessment purposes. It should be noted that these factors do not relate the toxicity of these chemicals to other chemicals (e.g., benzene). The most well-studied and one of the most toxic dioxin compounds is 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). 2,3,7,8-TCDD is given the base toxicity equivalence factor (TEF) of 1.0. Each of the other sixteen 2,3,7,8-CDD/CDF congeners is then assigned its own toxicity equivalence factor based on estimates of its toxicity relative to that of "dioxin". The TEFs of the other dioxin-like compounds range from 1 to 0.0001. These TEF values have been adopted by international convention and are listed in Box 3-2.

Box 3-2: Dioxin and Dioxin-like Compounds Category and Corresponding TEF Values

CAS Number	Chemical Name	TEF
	CDDs	
1746-01-6	2,3,7,8-tetrachlorodibenzo-p-dioxin	1
40321-76-4	1,2,3,7,8-pentachlorodibenzo-p-dioxin	1
39227-28-6	1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	0.1
57653-85-7	1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	0.1
19408-74-3	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	0.1
35822-46-9	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	0.01
3268-87-9	1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin	0.0001
	CDFs	
51207-31-9	2,3,7,8-tetrachlorodibenzofuran	0.1
57117-41-6	1,2,3,7,8-pentachlorodibenzofuran	0.05
57117-31-4	2,3,4,7,8-pentachlorodibenzofuran	0.5
70648-26-9	1,2,3,4,7,8-hexachlorodibenzofuran	0.1
57117-44-9	1,2,3,6,7,8-hexachlorodibenzofuran	0.1
72918-21-9	1,2,3,7,8,9-hexachlorodibenzofuran	0.1
60851-34-5	2,3,4,6,7,8-hexachlorodibenzofuran	0.1
67562-39-4	1,2,3,4,6,7,8-heptachlorodibenzofuran	0.01
55673-89-7	1,2,3,4,7,8,9-heptachlorodibenzofuran	0.01
39001-02-0	1,2,3,4,6,7,8,9-octachlorodibenzofuran	0.0001

Figure 3-1: Distribution of TRI On-site and Off-site Releases, 2001: Dioxin and Dioxin-like Compounds



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Revisions of TEFs may periodically occur as new scientific data becomes available. Dioxin-like compounds are often found in complex mixtures. The relative toxicity of such a mixture is known as its toxic equivalency (TEQ). This is calculated by first multiplying the concentrations of the individual congeners by their respective TEFs then summing together the products to find the overall TEQ of the mixture.

Dioxin and dioxin-like compounds, like other TRI chemicals, are reported as quantities. In addition, however, the distribution of the members of the category is also reported.

More details on dioxin and dioxin-like compounds, their sources, chemical characteristics, health and environmental effects and efforts being undertaken to reduce pollution from dioxins can be found in the *2000 Toxics Release Inventory Public Data Release Report* (EPA 260-R-02-003).

2001 TRI DATA FOR DIOXIN AND DIOXIN-LIKE COMPOUNDS

On-site and Off-site Releases, 2001

As shown in Table 3-19, there were 1,320 TRI forms submitted for dioxin and dioxin-like compounds for 2001. On- and off-site releases for dioxin and dioxin-like compounds totaled 148,759 grams. Over half of total releases were released off-site as transfers to disposal, which totaled 91,101 grams or 61.2 percent (see Figure 3-1). The second largest release type was other on-site land releases (that is, other than RCRA subtitle C landfills), which totaled 42,808 grams. (Types of on-site land releases are described in Box 1-4 in Chapter 1.)

Much smaller amounts of other types of releases were reported. On-site land releases to RCRA subtitle C landfills in 2001 totaled 9,964 grams or 6.7 percent of total releases. Air emissions were 2,888 grams, and surface water discharges were 1,851 grams. On-site releases to underground injection of dioxin and dioxin-like compounds were 148 grams.

Waste Management Data, 2001

Quantities of TRI Chemicals in Waste

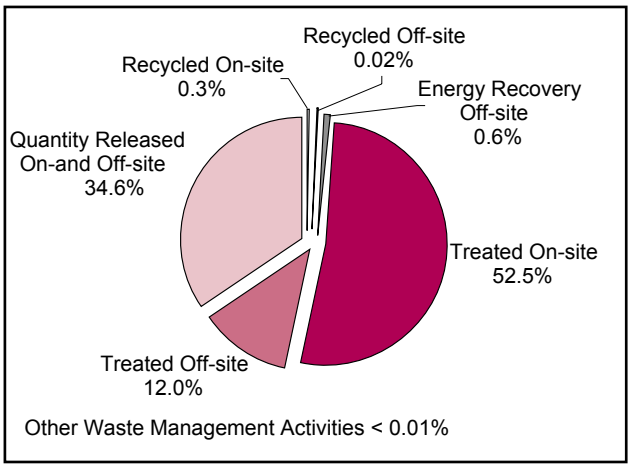
Dioxin and dioxin-like compounds in production-related waste totaled 446,649 grams in 2001, as shown in Table 3-20. A little more than half of this (234,296 grams or 52.5 percent) was treated on-site (see Figure 3-2). The quantity released on- and off-site totaled 154,421 grams or over one-third of the dioxin and dioxin-like compounds in production-

Table 3-19: TRI On-site and Off-site Releases, 2001: Dioxin and Dioxin-like Compounds

			On-site Releases							Off-site Releases	Total On- and Off-site Releases
					Underground Injection		On-site Land Releases				
CAS Number	Chemical	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	
		Number	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams
--	Dioxin and dioxin-like compounds	1,320	2,887.566	1,850.869	63.881	84.270	9,963.843	42,807.558	57,657.988	91,100.805	148,758.793

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Figure 3-2: Distribution of Quantities of TRI Chemicals in Waste, 2001: Dioxin and Dioxin-like Compounds



Note: Data are from Section 8 of Form R.

related waste. A total of 53,572 grams, or 12.0 percent, of dioxin and dioxin-like compounds was treated off-site. Just over 2,760 grams were in waste sent for energy recovery off-site and 1,484 grams were in waste in which the primary chemical was recycled on-site.

Transfers Off-site for Further Waste Management, including Disposal

Transfers off-site for further waste management, including disposal, of dioxin and dioxin-like compounds totaled 140,327 grams in 2001 (see Table 3-21). Other transfers off-site to disposal accounted for almost two-thirds of this amount, 91,116 grams or 64.9 percent (see Figure 3-3). Transfers to treatment accounted for 32.6 percent; the amount was 45,768 grams.

Other types of transfers off-site for further waste management and disposal in 2001 accounted for about 2.4 percent of the total. Transfers to energy recovery totaled 3,248 grams. All other types of transfers of dioxin and dioxin-like compounds totaled 195 grams in 2001.

TRI Data by State

Facilities in Texas, with 90 forms, submitted the largest number of forms in 2001 for dioxin and dioxin-like compounds. Pennsylvania and Louisiana ranked second and third, with 65 and 62 forms, respectively.

On- and Off-site Releases

In 2001, facilities in Delaware reported the largest total releases on- and off-site of dioxin and dioxin-like compounds (see Table 3-22). They reported a total of 76,715 grams, or 51.6 percent of the total for 2001. A large majority of Delaware's releases of dioxin and dioxin-like compounds were off-site releases (transfers to disposal). Delaware reported 77.8 percent of all reported off-site releases of dioxin and dioxin-like compounds in 2001.

As shown in Map 3-1, Texas and Mississippi along with Delaware reported the largest amounts of total releases of dioxin and dioxin-like compounds in 2001, with Texas reporting 28,426 grams and Mississippi reporting 18,728 grams. Tennessee was ranked fourth with 11,516 grams.

Mississippi, with the third largest total releases, reported the largest amounts of other on-site land releases (that is, other than RCRA subtitle C landfills), with 18,473 grams or 43.2 percent of all such land releases of dioxin and dioxin-like compounds in 2001. Texas, with the second largest total releases, had the largest releases to on-site RCRA subtitle C landfills, amounting to 9,209 grams.

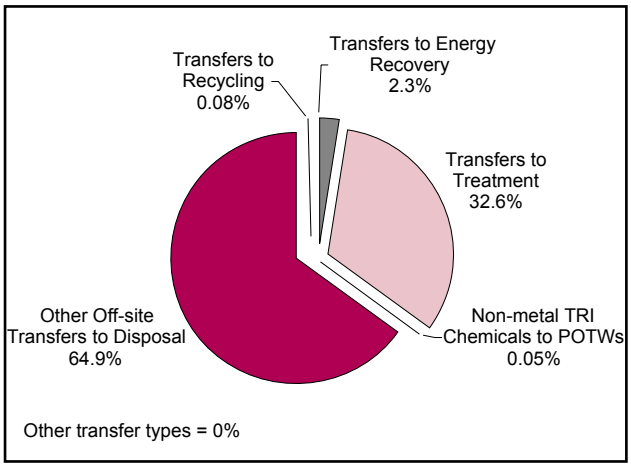
The state with the largest surface water discharges of dioxin and dioxin-like compounds in 2001 was

Table 3-20: Quantities of TRI Chemicals in Waste, 2001: Dioxin and Dioxin-like Compounds

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site Grams	Off-site Grams	On-site Grams	Off-site Grams	On-site Grams	Off-site Grams	Grams	Grams	Grams
--	Dioxin and dioxin-like compounds	1,484.197	102.870	11.524	2,760.403	234,296.365	53,572.009	154,421.201	446,648.570	13,212.890

Note: Data are from Section 8 of Form R.

Figure 3-3: Distribution of TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Dioxin and Dioxin-like Compounds



Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.

Texas with 730 grams. North Carolina reported the largest air emissions, with 497 grams.

Waste Management Data

The state with the largest quantity of dioxin and dioxin-like compounds in production-related waste in 2001 was Texas (see Table 3-23). Texas's 163,248 grams of dioxin and dioxin-like compounds in production-related waste was over two times that of any other state. Delaware ranked second with 76,731 grams. Michigan ranked third with 61,932 grams and Louisiana ranked fourth with 60,680 grams.

Texas accounted for almost half of the dioxin and dioxin-like compounds reported as treated on-site, 111,601 grams or 47.6 percent of the total. Utah facilities reported the largest amount treated off-site, 19,972 grams or 37.3 percent of the total, and Texas reported 18,431 grams treated off-site, over one-third of the total treated off-site.

The state with the largest quantity released on- and off-site was Delaware, with 76,715 grams or 49.7 percent of the total. Texas ranked second for releases on- and off-site with 33,215 grams and Mississippi was third with 18,728 grams.

TRI Data by Industry

On- and Off-site Releases

Chemical manufacturers accounted for the largest releases on- and off-site of dioxin and dioxin-like compounds in 2001 (see Table 3-24), 136,827 grams or 92.0 percent of all industry sectors reporting release of dioxin and dioxin-like compounds. The primary metals industry reported the second largest amount of releases of these compounds, 4,551 grams or 3.1 percent of total releases for all industry sectors.

The paper industry reported the third largest amount of releases, with 2,854 grams. One facility reported 2,277 grams of this as a one-time release from an old treatment system that contained dioxin and dioxin-like compounds from the time when the facility used chlorine.

The chemical industry also reported the largest amount of each individual type of release except air emissions. The largest type of release reported by the chemical industry was off-site releases

Table 3-21: TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Dioxin and Dioxin-like Compounds

CAS Number	Chemical	Transfers to Recycling Grams	Transfers to Energy Recovery Grams	Transfers to Treatment Grams	Transfers to POTWs: Metals and Metal Category Compounds Grams	Transfers to POTWs: Non-metal TRI Chemicals Grams	Other Off-site Transfers* Grams	Other Off-site Transfers to Disposal** Grams	Total Transfers for Further Waste Management, including Disposal Grams
--	Dioxin and dioxin-like compounds	118.613	3,248.079	45,767.920	0.000	76.441	0.000	91,116.041	140,327.093

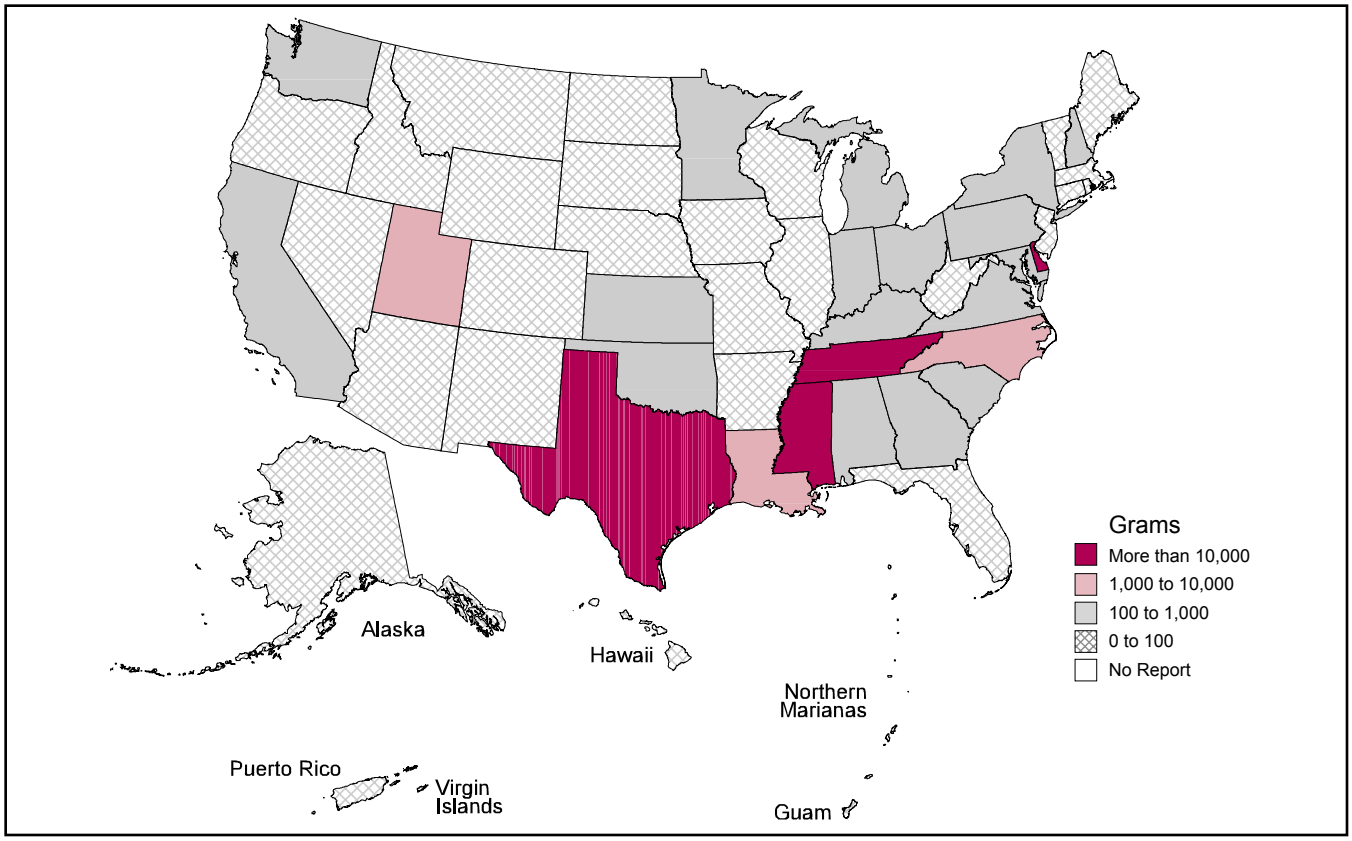
Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

Table 3-22: TRI On-site and Off-site Releases, by State, 2001: Dioxin and Dioxin-like Compounds

State	Total Forms	On-site Releases							Off-site Releases	Total On- and Off-site Releases
		Total Air Emissions	Surface Water Discharges	Underground Injection		On-site Land Releases		Total On-site Releases	Transfers Off-site to Disposal	
				Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases			
	Number	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams
Alabama	48	45.526	101.507	0.000	0.000	1.500	82.599	231.132	220.486	451.618
Alaska	6	8.369	7.540	0.000	0.000	0.000	0.000	15.909	0.000	15.909
Arizona	15	16.368	0.000	0.000	0.000	0.000	0.013	16.381	0.000	16.381
Arkansas	25	33.716	5.920	0.000	0.000	0.000	26.487	66.123	33.846	99.969
California	36	22.234	0.850	0.000	0.000	2.014	0.083	25.182	190.527	215.708
Colorado	15	5.811	0.074	0.000	0.000	0.000	0.000	5.885	6.923	12.808
Connecticut	12	7.142	1.300	0.000	0.000	0.000	0.000	8.442	1.299	9.741
Delaware	7	4.493	17.745	0.000	0.000	0.000	5,832.910	5,855.148	70,859.881	76,715.030
District of Columbia	1	0.101	0.000	0.000	0.000	0.000	0.000	0.101	0.000	0.101
Florida	46	70.154	9.134	0.000	0.000	0.000	17.897	97.185	0.000	97.185
Georgia	43	37.137	27.183	0.000	0.000	0.000	329.261	393.581	20.562	414.143
Guam	1	0.206	0.000	0.000	0.000	0.000	0.000	0.206	0.000	0.206
Hawaii	9	5.109	0.000	0.000	0.000	0.000	0.000	5.109	0.905	6.013
Idaho	6	1.695	4.178	0.000	0.000	0.000	5.766	11.638	61.510	73.148
Illinois	38	29.297	0.040	0.000	0.000	0.000	0.000	29.337	34.680	64.017
Indiana	49	184.512	0.017	0.000	0.000	0.000	122.942	307.470	233.362	540.832
Iowa	29	38.179	0.000	0.000	0.000	0.000	0.000	38.179	0.831	39.010
Kansas	18	41.008	0.000	63.751	0.000	0.000	1.540	106.299	0.000	106.299
Kentucky	34	25.040	0.022	0.000	0.450	0.000	251.055	276.567	186.119	462.686
Louisiana	62	90.930	607.364	0.130	0.000	8.200	901.671	1,608.295	1,228.593	2,836.888
Maine	16	9.385	2.107	0.000	0.000	0.000	3.409	14.901	1.927	16.827
Maryland	17	15.679	0.848	0.000	0.000	0.000	129.910	146.437	0.280	146.717
Massachusetts	8	11.451	0.100	0.000	0.000	0.000	0.000	11.551	0.223	11.774
Michigan	34	25.334	2.565	0.000	0.000	729.900	2.021	759.820	156.237	916.057
Minnesota	25	9.143	0.000	0.000	0.000	0.000	916.134	925.277	17.299	942.576
Mississippi	30	13.556	234.897	0.000	0.000	0.000	18,473.442	18,721.895	6.153	18,728.048
Missouri	37	33.200	20.393	0.000	0.000	1.370	0.018	54.981	0.158	55.138
Montana	8	17.593	0.162	0.000	0.000	0.000	0.049	17.804	0.152	17.956
Nebraska	9	3.751	0.000	0.000	0.000	0.000	1.070	4.821	0.000	4.821
Nevada	12	11.305	0.000	0.000	0.000	0.000	0.000	11.305	0.000	11.305
New Hampshire	4	214.890	0.000	0.000	0.000	0.000	0.142	215.032	0.000	215.032
New Jersey	19	8.256	0.430	0.000	0.000	1.020	0.000	9.706	33.180	42.886
New Mexico	5	5.737	0.000	0.000	0.000	0.000	0.000	5.737	0.000	5.737
New York	44	34.518	3.864	0.000	0.000	0.003	0.074	38.459	73.658	112.117
North Carolina	53	497.289	2.457	0.000	0.000	0.000	121.733	621.478	624.203	1,245.681
North Dakota	10	5.859	0.000	0.000	0.000	0.000	0.090	5.949	0.000	5.949
Ohio	61	51.529	0.756	0.000	0.000	2.200	153.491	207.976	260.014	467.990
Oklahoma	18	82.187	0.445	0.000	0.000	7.830	5.806	96.268	46.730	142.998
Oregon	20	11.536	2.985	0.000	0.000	0.000	1.101	15.621	14.477	30.098
Pennsylvania	65	205.461	0.951	0.000	0.000	0.000	5.056	211.469	168.754	380.223
Puerto Rico	8	13.227	0.003	0.000	0.000	0.000	0.000	13.229	0.424	13.653
Rhode Island	1	0.012	0.000	0.000	0.000	0.000	0.000	0.012	0.001	0.013
South Carolina	36	92.150	4.787	0.000	0.000	0.000	14.430	111.367	4.769	116.137
South Dakota	4	0.304	3.801	0.000	0.000	0.000	0.000	4.105	28.975	33.080
Tennessee	41	37.460	22.022	0.000	0.000	0.000	8,937.283	8,996.765	2,518.996	11,515.761
Texas	90	336.645	730.188	0.000	83.820	9,209.400	4,150.030	14,510.083	13,916.298	28,426.382
Utah	16	204.983	0.000	0.000	0.000	0.000	2,295.444	2,500.428	2.640	2,503.068
Vermont	1	0.858	0.000	0.000	0.000	0.000	0.000	0.858	0.000	0.858
Virgin Islands	3	1.120	0.034	0.000	0.000	0.000	0.000	1.154	0.000	1.154
Virginia	38	116.781	0.714	0.000	0.000	0.406	0.976	118.876	43.633	162.508
Washington	24	37.062	27.922	0.000	0.000	0.000	21.268	86.252	91.243	177.495
West Virginia	21	52.237	2.807	0.000	0.000	0.000	0.000	55.044	2.134	57.178
Wisconsin	33	51.997	2.763	0.000	0.000	0.000	2.354	57.113	8.726	65.839
Wyoming	9	8.048	0.000	0.000	0.000	0.000	0.000	8.048	0.000	8.048
Total	**1,320**	**2,887.566**	**1,850.869**	**63.881**	**84.270**	**9,963.843**	**42,807.558**	**57,657.988**	**91,100.805**	**148,758.793**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Map 3-1: Total On- and Off-site Releases, 2001: Dioxin and Dioxin-like Compounds



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

(transfers to disposal), with 86,209 grams of off-site releases or 94.6 percent of total off-site releases for dioxin and dioxin-like compounds in 2001. The second largest type of release for the chemical industry was other on-site land releases (that is, other than RCRA subtitle C landfills) of 38,784 grams or 90.6 percent of all such releases of dioxin and dioxin-like compounds.

Electric utilities reported the largest amount of air releases of dioxin and dioxin-like compounds in 2001 with 771 grams, accounting for 26.7 percent of all air emissions of dioxin and dioxin-like compounds from all industry sectors.

Waste Management

The chemical manufacturing industry reported the largest amount of dioxin and dioxin-like compounds in production-related waste in 2001 (see Table 3-25). With 390,833 grams of dioxin and dioxin-like compounds in production-related waste, it accounted for 87.5 percent of the total. More than half of the dioxin and dioxin-like compounds in production-related waste reported by the chemical industry (226,853 grams or 58.0 percent) was treated on-site.

The primary metals industry reported the second largest amount of dioxin and dioxin-like compounds in production-related waste, with 30,314 grams or 6.8 percent of the total for dioxin and dioxin-like compounds in 2001. The lumber industry reported the third largest amount of dioxin and dioxin-like compounds in production-related waste, with 18,391 grams or 4.1 percent of the total. Almost two thirds of the dioxin and dioxin-like compounds in production-related waste reported by the lumber industry (11,679 grams or 63.5 percent) was treated off-site.

Table 3-23: Quantities of TRI Chemicals in Waste, by State, 2001: Dioxin and Dioxin-like Compounds

State	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
	On-site Grams	Off-site Grams	On-site Grams	Off-site Grams	On-site Grams	Off-site Grams	Grams	Grams	Grams
Alabama	190.000	0.000	0.000	778.085	760.454	222.053	421.981	2,372.573	489.033
Alaska	0.000	0.000	0.000	0.000	0.000	0.000	15.947	15.947	0.000
Arizona	32.790	0.000	0.000	0.000	0.000	0.000	16.381	49.171	2.210
Arkansas	0.500	0.056	0.000	0.000	188.362	0.000	99.953	288.871	0.000
California	0.000	98.810	0.000	1.150	49.472	63.525	215.909	428.866	0.000
Colorado	0.000	0.000	0.000	0.000	5.083	0.000	12.798	17.881	0.000
Connecticut	0.000	0.000	0.000	0.000	7.200	0.000	9.801	17.001	0.000
Delaware	0.000	0.000	0.000	0.000	0.000	15.631	76,715.030	76,730.661	0.000
District of Columbia	0.000	0.000	0.000	0.000	0.000	0.000	0.101	0.101	0.000
Florida	0.000	0.000	0.000	0.000	0.000	0.151	97.694	97.844	0.000
Georgia	0.000	0.000	0.140	800.000	148.959	46.512	409.531	1,405.142	5.074
Guam	0.000	0.000	0.000	0.000	0.000	0.000	0.206	0.206	0.000
Hawaii	0.000	0.000	0.000	0.000	0.000	0.000	6.013	6.013	0.000
Idaho	0.000	0.000	2.856	0.000	0.000	0.000	73.148	76.004	0.000
Illinois	0.000	0.001	0.000	16.000	0.000	0.605	63.817	80.423	0.000
Indiana	0.000	0.000	0.000	0.000	1,232.735	0.606	540.559	1,773.900	0.000
Iowa	0.000	0.000	0.000	0.000	0.000	0.000	38.179	38.179	0.000
Kansas	0.000	0.000	0.000	0.000	0.000	50.309	106.300	156.609	0.366
Kentucky	0.000	0.000	0.000	0.000	44.184	0.246	2,068.778	2,113.209	0.000
Louisiana	1,092.190	0.000	0.000	0.000	53,735.638	2,931.113	2,921.007	60,679.948	0.000
Maine	0.000	0.300	0.180	0.000	0.000	0.000	17.147	17.627	0.000
Maryland	0.014	0.002	1.300	0.000	0.000	0.067	146.680	148.063	0.035
Massachusetts	0.000	0.127	0.000	0.000	0.000	0.000	11.771	11.898	0.000
Michigan	0.000	0.000	0.000	0.000	61,738.700	8.237	185.520	61,932.456	729.730
Minnesota	0.000	0.028	0.000	1,160.176	119.617	41.291	942.576	2,263.688	0.010
Mississippi	21.640	0.000	0.000	3.126	8.000	3,196.409	18,728.094	21,957.268	215.000
Missouri	0.000	0.000	0.000	0.000	0.000	309.316	55.450	364.766	1.356
Montana	0.000	0.000	0.000	0.000	0.000	0.000	17.823	17.823	0.000
Nebraska	0.000	0.000	0.000	0.000	0.000	0.000	3.751	3.751	0.039
Nevada	146.903	0.000	0.000	0.000	0.002	198.333	11.105	356.343	0.000
New Hampshire	0.000	0.000	0.000	0.000	0.000	0.000	214.890	214.890	0.000
New Jersey	0.000	2.200	0.000	0.000	0.000	5.540	51.019	58.759	0.000
New Mexico	0.000	0.000	0.000	0.000	0.000	0.000	5.737	5.737	0.000
New York	0.000	0.350	1.689	0.000	1,155.070	1.900	112.657	1,271.666	8,590.000
North Carolina	0.000	0.001	0.389	0.000	13.518	392.373	1,180.298	1,586.579	119.457
North Dakota	0.000	0.000	0.000	0.000	0.000	0.000	5.949	5.949	0.000
Ohio	0.000	0.023	0.000	0.000	608.260	50.045	468.462	1,126.790	0.000
Oklahoma	0.000	0.000	0.000	0.000	0.000	1.477	143.039	144.516	0.000
Oregon	0.000	0.013	0.000	0.000	9.200	1,279.521	32.444	1,321.178	42.064
Pennsylvania	0.000	0.461	4.962	0.000	9.160	0.904	380.507	395.993	0.000
Puerto Rico	0.000	0.000	0.000	0.000	0.000	0.000	13.653	13.653	0.000
Rhode Island	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.013	0.000
South Carolina	0.000	0.000	0.000	1.865	11.041	5,638.650	116.663	5,768.219	0.000
South Dakota	0.000	0.000	0.000	0.000	0.000	237.933	33.080	271.012	0.000
Tennessee	0.000	0.284	0.000	0.000	2,529.442	2.062	11,519.071	14,050.858	2,277.000
Texas	0.000	0.200	0.000	0.000	111,601.322	18,431.312	33,214.745	163,247.579	741.505
Utah	0.000	0.000	0.000	0.000	6.980	19,972.000	2,503.081	22,482.061	0.000
Vermont	0.000	0.000	0.000	0.000	0.000	0.000	0.858	0.858	0.000
Virgin Islands	0.000	0.000	0.000	0.000	0.000	0.000	1.154	1.154	0.000
Virginia	0.000	0.000	0.000	0.000	0.000	0.000	163.216	163.216	0.000
Washington	0.160	0.000	0.008	0.000	179.042	473.484	175.599	828.292	0.010
West Virginia	0.000	0.000	0.000	0.000	0.004	0.407	57.164	57.575	0.000
Wisconsin	0.000	0.014	0.000	0.000	134.921	0.000	66.809	201.744	0.000
Wyoming	0.000	0.000	0.000	0.000	0.000	0.000	8.047	8.047	0.000
Total	**1,484.197**	**102.870**	**11.524**	**2,760.403**	**234,296.365**	**53,572.009**	**154,421.201**	**446,648.570**	**13,212.890**

Note: Data are from Section 8 of Form R.

Table 3-24: TRI On-site and Off-site Releases, by Industry, 2001: Dioxin and Dioxin-like Compounds

			On-site Releases							Off-site Releases	Total
					Underground Injection		On-site Land Releases				
SIC Code	Industry	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	On- and Off-site Releases
		Number	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams	Grams
10	Metal Mining	11	10.777	0.015	0.000	0.000	0.000	11.180	21.972	0.000	21.972
12	Coal Mining	1	0.000	0.000	0.000	0.000	0.000	21.706	21.706	0.000	21.706
20	Food	24	8.045	0.000	0.000	0.000	0.000	0.088	8.133	0.135	8.268
21	Tobacco	1	0.390	0.000	0.000	0.000	0.000	0.000	0.390	0.000	0.390
22	Textiles	1	0.100	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.100
24	Lumber	125	349.471	404.008	0.000	0.000	0.000	9.796	763.275	932.735	1,696.010
25	Furniture	8	116.469	0.000	0.000	0.000	0.000	0.000	116.469	0.000	116.469
26	Paper	166	111.395	84.142	0.000	0.000	0.406	286.878	482.821	2,370.729	2,853.550
28	Chemicals	139	405.026	1,340.958	63.881	83.820	9,940.323	38,784.447	50,618.456	86,208.587	136,827.043
29	Petroleum	63	24.115	6.444	0.000	0.000	0.000	5.444	36.003	15.514	51.517
30	Plastics	2	214.402	0.000	0.000	0.000	0.000	0.142	214.544	0.000	214.544
31	Leather	1	0.015	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.015
32	Stone/Clay/Glass	108	257.509	0.000	0.000	0.450	0.000	13.695	271.654	0.080	271.734
33	Primary Metals	121	469.880	0.030	0.000	0.000	1.370	2,739.270	3,210.550	1,340.465	4,551.015
34	Fabricated Metals	1	0.035	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.035
35	Machinery	1	0.214	0.000	0.000	0.000	0.000	0.000	0.214	0.000	0.214
37	Transportation Equip.	4	0.829	0.000	0.000	0.000	0.000	0.000	0.829	0.000	0.829
38	Measure/Photo.	1	3.340	3.200	0.000	0.000	0.000	0.002	6.542	1.956	8.498
--	Multiple codes 20-39	37	108.412	4.522	0.000	0.000	0.000	12.036	124.970	181.782	306.751
--	No codes 20-39	7	6.729	7.540	0.000	0.000	0.000	0.000	14.269	0.000	14.269
491/493	Electric Utilities	482	770.976	0.010	0.000	0.000	0.000	921.804	1,692.791	8.094	1,700.884
5169	Chemical Wholesale Distributors	1	4.864	0.000	0.000	0.000	0.000	0.000	4.864	10.780	15.644
5171	Petroleum Terminals/Bulk Storage	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7389/4953	Hazardous Waste/Solvent Recovery	14	24.574	0.000	0.000	0.000	21.744	1.070	47.388	29.948	77.335
	Total	**1,320**	**2,887.566**	**1,850.869**	**63.881**	**84.270**	**9,963.843**	**42,807.558**	**57,657.988**	**91,100.805**	**148,758.793**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Projected Quantities of TRI Chemicals Managed in Waste, 2001-2003

TRI facilities expected to decrease their dioxin and dioxin-like compounds in production-related waste between 2001 and 2002 by 9.2 percent, from 446,649 grams to 405,777 grams (see Table 3-26). The decrease was projected to occur primarily in quantities reported as being treated on-site and in the quantity released on- and off-site. From 2002 to 2003, a decrease of 22.8 percent was projected, resulting in a total decrease from 2001 to 2003 of 29.9 percent. Decreases were expected to occur primarily in amounts treated on-site and in the quantity released on- and off-site.

The amount of dioxin and dioxin-like compounds in production-related waste increased 23.5 percent between the prior year of 2000 and 2001, with reported amounts going from 361,556 grams to 446,649 grams. The quantity released on- and off-site increased by the largest amount, 67,516 grams or 77.7 percent. It is expected to continue increasing through 2002 and then decrease in 2003.

Source Reduction

In 2001, 68 forms were filed reporting source reduction activities for dioxin and dioxin-like compounds (see Table 3-27). As noted in **Waste Management** in Chapter 1, source reduction—an activity that prevents the generation of waste—is preferred to waste management. These 68 forms represented 5.2 percent of all forms submitted for dioxin and dioxin-like compounds in 2001.

The most frequently reported source reduction activity was good operating practices (listed on 23 forms). Process modifications came next, with 16 forms, followed by raw materials modifications, with 12 forms.

On- and Off-site Releases, 2000-2001

On- and off-site releases of dioxin and dioxin-like compounds in 2001 were 148,759 grams, an

Table 3-25: Quantities of TRI Chemicals in Waste, by Industry, 2001: Dioxin and Dioxin-like Compounds

SIC Code	Industry	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site Grams	Off-site Grams	On-site Grams	Off-site Grams	On-site Grams	Off-site Grams	Grams	Grams	Grams
10	Metal Mining	0.000	0.000	0.000	0.000	0.003	0.000	21.972	21.975	0.000
12	Coal Mining	0.000	0.000	0.000	0.000	0.000	0.000	21.706	21.706	0.000
20	Food	0.000	0.000	0.000	0.000	0.000	0.554	8.268	8.822	0.000
21	Tobacco	0.000	0.000	0.000	0.000	0.000	0.000	0.390	0.390	0.000
22	Textiles	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.100	0.000
24	Lumber	1,450.703	0.280	0.000	2,741.388	851.632	11,678.996	1,667.540	18,390.540	751.028
25	Furniture	0.000	0.000	0.000	0.000	0.000	0.000	170.601	170.601	0.000
26	Paper	0.000	1.304	5.679	0.000	473.026	8.757	2,746.019	3,234.784	2,397.977
28	Chemicals	0.514	0.285	1.300	19.015	226,853.141	21,471.800	142,486.721	390,832.777	10,061.031
29	Petroleum	0.190	0.001	0.000	0.000	22.592	12.978	151.942	187.704	0.104
30	Plastics	0.000	0.000	0.000	0.000	0.000	0.000	214.402	214.402	0.000
31	Leather	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.015	0.000
32	Stone/Clay/Glass	0.000	0.000	1.689	0.000	0.000	0.000	267.617	269.306	0.466
33	Primary Metals	32.790	2.200	0.000	0.000	5,747.618	19,986.728	4,544.909	30,314.245	0.000
34	Fabricated Metals	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.035
35	Machinery	0.000	0.000	0.000	0.000	0.000	0.000	0.214	0.214	0.000
37	Transportation Equip.	0.000	0.000	0.000	0.000	0.000	0.000	0.829	0.829	0.000
38	Measure/Photo.	0.000	0.000	0.000	0.000	35.000	0.000	8.500	43.500	0.000
--	Multiple codes 20-39	0.000	0.000	2.856	0.000	43.230	19.907	301.545	367.538	0.039
--	No codes 20-39	0.000	0.000	0.000	0.000	0.000	392.289	14.307	406.596	0.000
491/493	Electric Utilities	0.000	98.800	0.000	0.000	0.000	0.000	1,701.692	1,800.492	2.210
5169	Chemical Wholesale Distributors	0.000	0.000	0.000	0.000	0.000	0.000	15.644	15.644	0.000
5171	Petroleum Terminals/Bulk Storage	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7389/4953	Hazardous Waste/Solvent Recovery	0.000	0.000	0.000	0.000	270.122	0.000	76.268	346.390	0.000
	Total	**1,484.197**	**102.870**	**11.524**	**2,760.403**	**234,296.365**	**53,572.009**	**154,421.201**	**446,648.570**	**13,212.890**

Note: Data are from Section 8 of Form R.

Table 3-26: Prior Year, Current Year and Projected Quantities of TRI Chemicals in Waste, 2000-2003: Dioxin and Dioxin-like Compounds

Waste Management Activity	Prior Year 2000		Current Year 2001		Projected 2002		Projected 2003	
	Total Grams	Percent of Total	Total Grams	Percent of Total	Total Grams	Percent of Total	Total Grams	Percent of Total
Recycled On-site	4,448.637	1.2	1,484.197	0.3	1,360.764	0.3	1,360.845	0.4
Recycled Off-site	8,935.037	2.5	102.870	0.0	102.900	0.0	102.931	0.0
Energy Recovery On-site	24.271	0.0	11.524	0.0	10.161	0.0	9.861	0.0
Energy Recovery Off-site	1,367.318	0.4	2,760.403	0.6	1,822.856	0.4	1,822.856	0.6
Treated On-site	238,362.567	65.9	234,296.365	52.5	203,543.753	50.2	163,036.642	52.1
Treated Off-site	21,512.614	6.0	53,572.009	12.0	41,421.285	10.2	41,716.100	13.3
Quantity Released On- and Off-site	86,905.616	24.0	154,421.201	34.6	157,515.450	38.8	105,012.770	33.5
Total Production-related Waste Managed	**361,556.059**	**100.0**	**446,648.570**	**100.0**	**405,777.169**	**100.0**	**313,062.004**	**100.0**

Waste Management Activity	Change 2000-2001 Percent	Projected Change 2001-2002 Percent	Projected Change 2002-2003 Percent	Projected Change 2001-2003 Percent
Recycled On-site	-66.6	-8.3	0.0	-8.3
Recycled Off-site	-98.8	0.0	0.0	0.1
Energy Recovery On-site	-52.5	-11.8	-3.0	-14.4
Energy Recovery Off-site	101.9	-34.0	0.0	-34.0
Treated On-site	-1.7	-13.1	-19.9	-30.4
Treated Off-site	149.0	-22.7	0.7	-22.1
Quantity Released On- and Off-site	77.7	2.0	-33.3	-32.0
Total Production-related Waste Managed	**23.5**	**-9.2**	**-22.8**	**-29.9**

Note: Data from Section 8 of Form R for 2001.

Table 3-27: Number of Forms Reporting Source Reduction Activity, by Category, 2001: Dioxin and Dioxin-like Compounds

CAS Number	Chemical	Total Form Rs	Forms Reporting Source Reduction Activity		Category of Source Reduction Activity							
				Percent of All Form Rs	Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Materials Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
		Number	Number	Percent	Number	Number	Number	Number	Number	Number	Number	Number
--	Dioxin and dioxin-like compounds	1,320	68	5.2	23	7	8	12	16	0	1	1

Note: All source reduction activities on a form are counted in the corresponding category. Totals do not equal the sum of the categories because forms may report more than one source reduction activity.

increase of 49,714 grams or 50.2 percent from 2000 (see Table 3-28). On-site releases increased by 29.6 percent and off-site releases (transfers to disposal) increased by 36,548 grams or 67.0 percent.

The increase in on-site releases was due to increases in on-site land releases, which increased by 14,536 grams or 38 percent. This included an increase of 5,060 grams in releases to RCRA subtitle C landfills and 9,476 grams to other on-site landfills.

The increase in off-site releases (transfers to disposal) was primarily due to the increase in transfers to landfills/surface impoundments. These transfers increased by over 300 percent, or by 43,614 grams.

Other types of releases of dioxin and dioxin-like compounds decreased from 2000 to 2001. On-site air releases decreased by 902 grams or 23.8 percent, surface water discharges decreased by 211 grams or 10.2 percent and underground injection decreased by 257 grams or 63.4 percent.

Waste Management Data, 2000-2001

Quantities of TRI Chemicals in Waste, 2000-2001

Dioxin and dioxin-like compounds in production-related waste increased from 386,920 grams in 2000 to 446,649 grams in 2001, an increase of 15.4 percent (see Table 3-29). The quantity released on- and off-site increased by 55,676 grams or 56.4 percent and the amount treated off-site increased by 21,427 grams or 66.7 percent.

Decreases were reported in the amount of dioxin and dioxin-like compounds in waste treated on-site, a decrease of 15,247 grams or 6.1 percent. The amount of dioxin and dioxin-like compounds in waste recycled on-site also decreased, by 2,964 grams or 66.6 percent.

Transfers Off-site for Further Waste Management, including Disposal, 2000-2001

As shown in Table 3-30, transfers off-site for further waste management, including disposal, of dioxin and dioxin-like compounds increased from 2000 to 2001, by 25,034 grams or 21.7 percent. Other off-site transfers to disposal increased by 36,519 grams or 66.9 percent. Dioxin and dioxin-like compounds in waste sent for energy recovery also increased, by 1,069 grams or 49.1 percent.

Decreases were reported in the amount of dioxin and dioxin-like compounds in waste sent off-site for treatment. Transfers to treatment decreased by 12,614 grams or 21.6 percent. Other decreases reported were in transfers of non-metal TRI chemicals to POTWs, of 45 grams.

Table 3-28: TRI On-site and Off-site Releases, 2000-2001: Dioxin and Dioxin-like Compounds

	2000 Number	2001 Number	Change 2000-2001 Number	Change 2000-2001 Percent
Forms	1,309	1,320	11	0.8
	Grams	**Grams**	**Grams**	**Percent**
Total Air Emissions	3,789.081	2,887.566	-901.515	-23.8
Surface Water Discharges	2,061.866	1,850.869	-210.997	-10.2
Underground Injection	405.192	148.151	-257.040	-63.4
Class I Wells	284.112	63.881	-220.230	-77.5
Class II-V Wells	121.080	84.270	-36.810	-30.4
On-site Land Releases	38,235.732	52,771.401	14,535.668	38.0
RCRA Subtitle C Landfills	4,903.737	9,963.843	5,060.106	103.2
Other On-site Land Releases	33,331.995	42,807.558	9,475.563	28.4
Total On-site Releases	**44,491.872**	**57,657.988**	**13,166.116**	**29.6**
Storage Only*	747.498	626.014	-121.484	-16.3
Solidification/Stabilization**	0.000	0.000	0.000	--
Metals and Metal Category Compounds Only	0.000			
Wastewater Treatment (Excluding POTWs)***	0.000	0.000	0.000	--
Metals and Metal Category Compounds Only				
Transfers to POTWs****	0.000	0.000	0.000	--
Metals and Metal Category Compounds Only				
Underground Injection	0.002	227.542	227.540	11,149,457.8
Landfills/Surface Impoundments	14,392.764	58,006.294	43,613.530	303.0
Land Treatment	7.037	1.068	-5.970	-84.8
Other Land Disposal	56.486	66.248	9.762	17.3
Other Off-site Management	38,684.082	31,309.922	-7,374.160	-19.1
Transfers to Waste Broker for Disposal	663.733	859.350	195.617	29.5
Unknown*****	1.265	4.368	3.103	245.2
Total Off-site Releases (Transfers Off-site to Disposal)	**54,552.868**	**91,100.805**	**36,547.938**	**67.0**
Total On- and Off-site Releases	**99,044.739**	**148,758.793**	**49,714.054**	**50.2**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

* Storage only (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to storage only are included as a form of disposal (off-site release). See Box 1-5.

** Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal cateogry compounds (waste treatment code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste treatment code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 1-6. Reports under code M40 of metals and metal category compounds have been included in solidification/stabilization of metals and metal cateogry compounds in this report.

*** Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal category compounds (waste treatment code M61) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste treatment code M60). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 1-6. Transfers of metals and metal category compounds reported under code M60 have been included in transfers of metals and metal category compounds to wastewater treatment.

**** Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal category compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

***** Unknown (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as unknown transfers are treated as a form of disposal (off-site release).

Table 3-29: Quantities of TRI Chemicals in Waste by Waste Management Activity, 2000-2001: Dioxin and Dioxin-like Compounds

Waste Management Activity	2000 Grams	2001 Grams	Change 2000-2001 Grams	Change 2000-2001 Percent
Recycled On-site	4,448.624	1,484.197	-2,964.427	-66.6
Recycled Off-site	21.942	102.870	80.928	368.8
Energy Recovery On-site	21.426	11.524	-9.902	-46.2
Energy Recovery Off-site	1,994.612	2,760.403	765.791	38.4
Treated On-site	249,543.109	234,296.365	-15,246.745	-6.1
Treated Off-site	32,144.789	53,572.009	21,427.221	66.7
Quantity Released On- and Off-site	98,745.115	154,421.201	55,676.086	56.4
Total Production-related Waste Managed	**386,919.617**	**446,648.570**	**59,728.953**	**15.4**
Non-production-related Waste Managed	26,821.006	13,212.890	-13,608.117	-50.7

Note: Data are from Section 8 of Form R of year indicated.

Table 3-30: TRI Transfers Off-site for Further Waste Management, including Disposal, 2000-2001: Dioxin and Dioxin-like Compounds

	2000	2001	Change 2000-2001	
	Grams	Grams	Grams	Percent
Transfers to Recycling	12.700	118.613	105.913	834.0
Transfers to Energy Recovery	2,178.711	3,248.079	1,069.368	49.1
Transfers to Treatment	58,382.169	45,767.920	-12,614.250	-21.6
Transfers to POTWs	121.869	76.441	-45.428	-37.3
Metals and Metal Category Compounds	0.000	0.000	0.000	--
Non-metal TRI Chemicals	121.869	76.441	-45.428	-37.3
Other Off-site Transfers*	0.000	0.000	0.000	--
Other Off-site Transfers to Disposal**	54,597.527	91,116.041	36,518.514	66.9
Total Transfers for Further Waste Management, including Disposal	**115,292.977**	**140,327.093**	**25,034.116**	**21.7**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

Lead and Lead Compounds

INTRODUCTION

Lead (CAS 7439-92-1) is a heavy, silver-white metal in its pure (elemental) form. When exposed to air, it reacts with it and turns bluish-gray. Its physical properties include a relatively low melting point (327°C), high density, and an ability to shield radiation, sound waves, and mechanical vibrations. Lead exists in either one of two ways: as the pure metal (i.e., lead metal) or as a compound, in which the lead is combined with some other element or elements. Examples of lead compounds include: lead oxide, lead sulfide, and lead acetate. Lead metal and lead compounds are widely used in a variety of products and applications that include: lead-acid batteries, ammunition, construction materials, solder, metal castings, glass and ceramic products, plastics, electrical cable coverings, lubricating oils and greases, and certain paints (EPA, OPPT, October 2000). In 2001, an estimated 1,590,000 metric tons of lead were consumed in products used in the United States (USGS, 2001). Lead is also present in low concentrations in ores and fuels.

Lead is a highly toxic substance. In humans, lead is primarily toxic to the nervous system and kidneys. Exposure of the general population to lead occurs primarily from ingestion of food or nonfood items that contain lead, and from inhalation of air contaminated with lead vapors or particulate matter that contains lead. Lead and lead compounds have been listed on the EPCRA section 313 list of toxic chemicals since the list was established by Congress in 1986.

Due to the ability of lead to persist in the environment and bioaccumulate in aquatic organisms and humans, EPA finalized a rule in 2001 that designated lead and lead compounds as persistent bioaccumulative toxic (PBT) chemicals, and lowered the TRI reporting thresholds for lead and lead compounds to 100 pounds, beginning with the 2001 reporting year (EPA, OEI, January 2001). The lower threshold applies to lead and lead compounds except for lead when it is contained in stainless steel, brass, or bronze alloys (EPA, OEI, January 2001).

SOURCES AND USES

Lead is often obtained by primary production through mining of ores or by secondary production through recycling. The production of lead from ores has fallen in recent years, from 853,000 metric tons in 1999 to 744,000 metric tons in 2001. The major source of refined lead in the U.S. is recovered from lead scrap. In 2001, 1,100,000 metric tons, or 79 percent of the total lead produced domestically, was domestic refined lead recovered from lead scrap. Lead obtained from lead scrap increased from 1,110,000 metric tons in 1999 to 1,130,000 metric tons in 2000 and then fell to 1,100,000 metric tons in 2001. The 2001 domestic production of recoverable lead from lead ores was 454,000 metric tons, or 25 percent of the total lead produced domestically. An additional 290,000 metric tons of lead was recovered from ores other than lead ore, such as copper ores (USGS, 2001).

Most of the lead ore mined in the United States is mined in Alaska and the "lead-belt" in southeast Missouri (93 percent in 2001). Lead is also mined in Idaho, Montana, Nevada and New York. Lead ore is mined underground except when it is mined with copper ores, which are typically mined in open pits. The lead content of ores generally ranges from 3 to 8 percent, and is usually in the form of a lead compound. Lead ore concentrates are processed at primary lead smelter/refinery plants to produce lead metal or alloys (EPA, OEI, December 2001).

Currently, there are twelve lead-producing mines in the United States operated by six companies, including Teck Cominco Alaska Inc., Kennecott Greens Creek Mining Co. in Alaska, and Doe Run

Resources Corp. in Missouri. Two smelter-refinery operations in Missouri run by Doe Run Resources Corp. process the lead ore and recover lead from lead scrap, yielding an estimated 490,000 tons of refined lead and lead alloy products in 2001. ASARCO Inc. (owned by Grupo Mexico, S.A. de C.V.) suspended operations of its lead smelter in East Helena, Montana during 2001, citing increased production costs, poor market conditions and a decrease in the supply of lead concentrate feed for the smelter. In prior years, this smelter had produced an average of 75,000 tons per year of lead bullion (USGS, 2001).

Lead is among the most recycled of nonferrous metals in the world. Secondary production (from recycled materials) accounted for approximately 79 percent of domestic lead production in 2001. While 17 companies produced secondary lead in 2001, almost all the secondary lead (99 percent) was produced by 7 companies operating 15 plants in Alabama, California, Florida, Indiana, Louisiana, Minnesota, Missouri, New York, Pennsylvania, Tennessee, and Texas. Nearly 91 percent of all secondary lead is generated from scrap lead-acid batteries (USGS, 2001). Furnaces are used to reduce lead compounds in scrap lead to elemental lead, which may then be refined or alloyed (EPA, OAQPS, May 1998).

Lead and lead compounds are used in the manufacture of a variety of products. The most prominent uses of lead and lead compounds are in storage batteries, pigments and ceramic products, ammunition, sheet lead, casting metal and solder. The manufacture of batteries represents the largest commercial use of lead and lead compounds in the United States, accounting for 87 percent (1,390,000 metric tons) of lead consumption in 2001 (USGS, 2001). Lead and lead compounds are used in batteries because of the ability of lead to resist the corrosiveness of sulfuric acid and because it is an inexpensive material. Lead-antimony alloys are typically used for the internal grid of the battery, as well as for the posts connecting the battery to the apparatus being powered. Lead-acid batteries are used for starting, lighting, ignition (SLI) in automobiles and other mobile devices, and other stationary industrial uses such as uninterruptible power sources for hospitals and computer networks (EPA, OPPT, October 2000).

Lead is also used extensively in the ceramics industry. Lead compounds are incorporated into glazes and enamels applied to a variety of ceramic products to enhance physical performance. Lead additives improve the durability, color, scratch resistance, and bonding of the glaze. Lead content in foodware ceramics, however, is restricted by governmental regulations to reduce health hazards posed by lead. Lead is also used extensively in the glass industry for many of its physical properties, including high density and ability to absorb radiation (television and X-ray shielding), excellent insulation and low melting point (fluorescent lights and neon signs), and high index of refraction (optical glass) (EPA, OPPT, October 2000). Lead used in ceramics and pigments in paint accounted for 43,900 metric tons of lead consumption in products during 2001 (USGS, 2001).

Lead is commonly the primary constituent of the bullet portion of most rifle and pistol ammunition. Lead is well suited for this purpose because of its high density and softness. The concentration of lead in lead bullets typically ranges between 99.7 to 99.9 percent. However, lead is sometimes alloyed with antimony, tin, or arsenic to increase the melting temperature, hardness, or surface tension of bullets or pellets (EPA, OPPT, October 2000). In 2001, 53,600 metric tons of lead were consumed for the production of lead bullets. Most of this lead was obtained from secondary (recycled) sources (USGS, 2001).

Various other industries use or make metal products that contain lead and lead compounds. These metal products include sheet lead, casting metals, solder, bearing metals, extruded products, and brass and bronze alloys. Lead is incorporated because of its malleability, ability to absorb radiation, density, and lubrication properties (EPA, OPPT, October 2000). In 2001, 88,400 metric tons of lead in such products were used (USGS, 2001).

The process of mining and refining lead, or producing or using the products that contain lead may result in releases of lead into the environment. While lead was eliminated from gasoline used to power automobiles, certain fuels (e.g., fuels used in aviation) still contain lead and continue to serve as a source of lead air emissions. Incineration of waste containing lead can also be a source of air emissions of lead, as lead cannot be destroyed during incineration, but instead will volatilize into the atmosphere.

Aside from the Toxics Release Inventory database, no other source is available that provides comprehensive, multimedia, national facility-reported releases and other waste management quantities of lead. However, using a "top-down" emission factor approach, EPA has estimated that in 1996 approximately 7.8 million pounds of lead were released to air by anthropogenic sources in the U.S. Of this amount, 58.1 percent (4.5 million pounds) was estimated to be emitted from manufacturing sources, including smelting and refining, 28.5 percent (2.2 million pounds) resulted from waste or fossil fuel combustion at point sources, and 13.4 percent (1.0 million pounds) was generated from mobile sources (EPA, OPPT, October 2000).

CHEMICAL CHARACTERISTICS

Persistence and Bioaccumulation

Lead is a metal and, as with all metals, cannot be destroyed. Lead persists indefinitely in the environment as either the pure metal, or in the form of a lead compound (A general discussion on the environmental fate of lead is provided in the next section.)

Lead is quite toxic to humans and other mammals. Lead has no known biological function in any living organism. Lead can be taken up by a variety of aquatic and terrestrial organisms, and accumulate in these organisms. For example, lead and certain lead compounds (i.e., lead salts) have bioconcentration factor (BCF) or bioaccumulation factor (BAF) values that range from 1,000 to 5,000 or greater in some aquatic organisms that include snails, algae and mussels. These and the other organisms are part of the food web. Lead that has accumulated within them can serve as a source of exposure to organisms to which lead is toxic (EPA, OEI, January 2001).

Humans exposed to lead will also bioaccumulate the lead. The bioaccumulation of lead in humans and the effects that such accumulation can have on human health is well documented. To summarize the many studies regarding the uptake and disposition of lead in humans, the results of these studies show or at least indicate that: 1) lead is absorbed by humans; 2) a significant portion of that quantity which is absorbed accumulates within the skeleton; 3) lead can remain in bone for many years; 4) chronic exposure to low levels of lead from environmental sources results in a continual build-up (accumulation) of lead in the human body, and this build-up is likely to continue for at least several years; and 5) lead which has accumulated in bone can later be reabsorbed from the bone (especially during periods of increased bone mineral loss (such as occurs during pregnancy, breast feeding, menopause, and old age), and enter the systemic circulation and partition to organs and other tissues to which lead is toxic. This latter scenario is particularly likely to occur when the individual has an increased demand for calcium (e.g., during pregnancy). There is evidence that suggests infants, children and African Americans may be especially susceptible to bioaccumulating lead, and certain genetic factors may increase an individual's susceptibility to accumulating lead.

Environmental Fate and Transport

Lead released into the environment in the form of lead metal or a lead compound may remain as such or convert to another lead compound. As with many metals, the specific form or forms in which lead will exist in a given locality depend largely on the prevailing environmental conditions of that locality.

Lead particles in the environment can attach to dust and be carried long distances in the air, and then subsequently deposited on surface soils and waters.

Once lead is deposited onto soil, it usually adheres to the soil particles. Lead can remain in soils for many years (EPA, OAQPS, November 2000). Release of the lead from the soil particles will depend on the type of lead compound and on the physical and chemical characteristics of the soil (ATSDR, August 1997). However, even lead that is bound in soils can still be absorbed by humans. Children are particularly susceptible to exposure to lead because they often play in dirt and lead is absorbed more efficiently by children than adults.

Lead may be mobile in soils under a range of environmental conditions. Variables including soil pH, soil organic matter content and the particular form(s) of lead present in soil play a significant role in the mobility of lead in soil. The degree to which lead sorbs to soil organic matter has been shown to be dependent on soil acidity. An increase in soil acidity (i.e., a decrease in soil pH) will cause lead bound to soil organic matter to become unbound, and can cause the concentrations of lead in soil water to increase. On the other hand, a decrease in soil acidity (i.e., an increase in soil pH) will cause lead in soil water to become bound to soil organic matter and, consequently, cause a decrease in the concentration of lead in soil water.

Lead bound to soil particles in water is unlikely to end up in underground water or drinking water unless the water is acidic. Small amounts of lead may enter rivers, lakes, and streams when soil particles from the land run-off into water bodies during rainstorms. Lead compounds present in water may combine with different chemicals depending on the acidity and temperature of the water (ATSDR, August 1997).

HEALTH AND ENVIRONMENTAL EFFECTS

Humans, animals and fish are mainly exposed to lead by breathing and ingesting it in food, water, soil, or dust, as it can be absorbed into the body from the lungs and from the gastrointestinal tract. Infants and young children are especially susceptible to the toxic effects caused by lead, even at low levels of exposure (EPA, OAQPS, November 2000).

The toxic effects of lead are the same whether it enters the body through inhalation or ingestion. Lead mainly affects the nervous system and kidneys in adults, fetuses, infants and children. Long-term exposure of adults to lead at work has resulted in decreased performance in some tests that measure functions of the nervous system. Lead exposure may also cause weakness in fingers, wrists, or ankles, or cause anemia. At higher levels of exposure, lead can severely damage the brain and kidneys in adults, fetuses, infants and children. In pregnant women, high levels of exposure to lead may cause miscarriage (ATSDR, August 1997).

Fetuses, infants and children are more sensitive to the toxic effects of lead than are adults. A child who ingests a significant amount of lead may develop anemia, kidney damage, colic, muscle weakness, and brain damage. If smaller amounts are ingested, much less severe effects on blood and brain function may occur. At still lower levels of exposure, lead can affect a child's mental and physical growth. Fetuses exposed to lead may be born prematurely and have lower weights at birth. Exposure in the womb, in infancy, or in early childhood may also slow mental development and lower intelligence later in childhood (ATSDR, August 1997).

Elevated levels of lead in water can cause reproductive damage in some aquatic species and, in others, blood and neurological changes. Wild and domestic animals may ingest lead while grazing. They experience the same kind of effects as people who are exposed to lead (EPA, OAQPS, November 2000).

EFFORTS TO REDUCE POLLUTION FROM THE CHEMICAL

Over the last 25 years, EPA has taken numerous steps to reduce and control lead in the environment in order to reduce exposure to lead. For example, in the early 1970s, EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The use of leaded gasoline in highway vehicles was banned by EPA in 1995 (EPA, OAQPS, November 2000).

EPA set national air quality standards for lead in 1978. EPA's lead air quality monitoring strategy focuses on areas surrounding industrial sources of lead such as primary and secondary lead smelters and battery manufacturers. Areas that have lead levels that exceed acceptable levels must develop and implement a plan to reduce their air emissions of lead (EPA, OAQPS, November 2000). EPA also has standards aimed to reduce air emissions (including lead) from medical waste incinerators, municipal waste combustors, and hazardous waste incinerators (EPA, OPPT, October 2000).

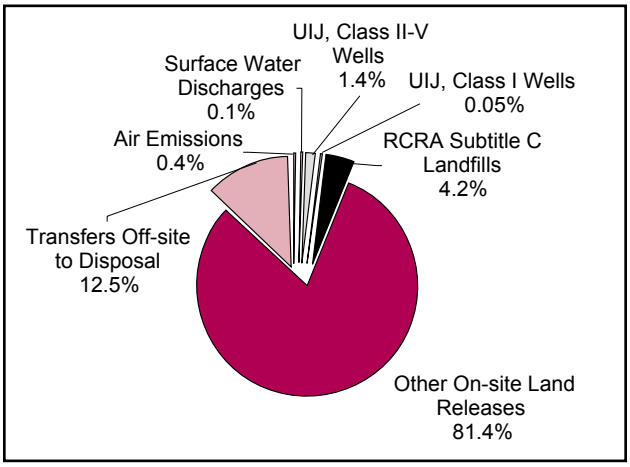
In 1978, EPA banned the use of lead in most paints, including paints used in residential structures (e.g., houses). Therefore, homes built after 1978 should not contain lead-based paints, except in those homes built within a few years after 1978 in which surplus supplies of lead-based paints may have been used. Federal regulations require a person selling a home to disclose any known lead-based hazards on the property (ATSDR, August 1997). The use of lead in solder for cans is banned, and lead content in dishes and other eating utensils is restricted. EPA's Lead Awareness Program (http://www.epa.gov/lead/leadpbed.htm) develops regulations, conducts research, and designs educational materials and outreach efforts in a continuing program to protect human health.

2001 TRI DATA FOR LEAD AND LEAD COMPOUNDS

On-site and Off-site Releases, 2001

As shown in Table 3-31, there were 8,561 TRI forms submitted for lead and lead compounds for 2001. On- and off-site releases of lead and lead compounds totaled 443.0 million pounds, with 422.2 million pounds of this reported as lead compounds. On-site releases represented 87.5 percent of total releases of lead and lead compounds, and off-site releases represented 12.5 percent in 2001.

Figure 3-4: Distribution of TRI On-site and Off-site Releases, 2001: Lead and Lead Compounds



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

UIJ = Underground injection

More than 80 percent of total releases of lead and lead compounds were other on-site land releases (that is, other than RCRA subtitle C landfills), which totaled 360.8 million pounds (see Figure 3-4). (Types of on-site land releases are described in Box 1-4 in Chapter 1.)

The second-largest release type was off-site releases (transfers to disposal), which totaled 55.3 million

Table 3-31: TRI On-site and Off-site Releases, 2001: Lead and Lead Compounds

			On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
CAS Number	Chemical	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
7439-92-1	Lead	4,201	378,740.71	51,297.37	0.00	6.65	12,623,535.98	2,681,130.01	15,734,710.71	5,079,312.56	20,814,023.27
--	Lead compounds	4,360	1,254,380.94	362,122.44	206,138.00	6,026,676.69	5,986,663.17	358,128,545.38	371,964,526.62	50,213,158.38	422,177,685.00
	Total	**8,561**	**1,633,121.66**	**413,419.80**	**206,138.00**	**6,026,683.34**	**18,610,199.14**	**360,809,675.39**	**387,699,237.33**	**55,292,470.94**	**442,991,708.27**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Table 3-32: TRI On-site and Off-site Releases, by Type of On- and Off-site Release, 2001: Lead and Lead Compounds

	2001	
	Pounds	Percent
On-site Releases		
Total Air Emissions	1,633,121.66	0.4
Surface Water Discharges	413,419.80	0.1
Underground Injection	6,232,821.34	1.4
Class I Wells	206,138.00	0.0
Class II-V Wells	6,026,683.34	1.4
On-site Land Releases	379,419,874.53	85.6
RCRA Subtitle C Landfills	18,610,199.14	4.2
Other On-site Land Releases	360,809,675.39	81.4
Total On-site Releases	**387,699,237.33**	**87.5**
Off-site Releases		
Storage Only*	288,904.99	0.1
Solidification/Stabilization**	19,575,554.32	4.4
Metals and Metal Category Compounds Only		
Wastewater Treatment (Excluding POTWs)***	87,994.96	0.0
Metals and Metal Category Compounds Only		
Transfers to POTWs****	48,948.57	0.0
Metals and Metal Category Compounds Only		
Underground Injection	11,775.02	0.0
Landfills/Surface Impoundments	31,332,076.12	7.1
Land Treatment	122,449.04	0.0
Other Land Disposal	421,613.66	0.1
Other Off-site Management	680,228.12	0.2
Transfers to Waste Broker for Disposal	1,943,805.59	0.4
Unknown*****	779,120.56	0.2
Total Off-site Releases	**55,292,470.94**	**12.5**
(Transfers Off-site to Disposal)		
Total On- and Off-site Releases	**442,991,708.27**	**100.0**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

* Storage only (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to storage only are included as a form of disposal (off-site release). See Box 1-5.

** Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal cateogry compounds (waste treatment code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste treatment code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 1-6. Reports under code M40 of metals and metal category compounds have been included in solidification/stabilization of metals and metal cateogry compounds in this report.

*** Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal category compounds (waste treatment code M61) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste treatment code M60). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 1-6. Transfers of metals and metal category compounds reported under code M60 have been included in transfers of metals and metal category compounds to wastewater treatment.

**** Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal category compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

***** Unknown (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as unknown transfers are treated as a form of disposal (off-site release).

pounds and accounted for 12.5 percent of total releases. Off-site releases were mainly transfers to landfills/surface impoundments and to solidification/stabilization (see Table 3-32). Transfers of lead and lead compounds in 2001 to landfills/surface impoundments totaled 31.3 million pounds and those to solidification/stabilization were 19.6 million pounds.

Smaller amounts from other types of releases of lead or lead compounds were reported. On-site land releases to RCRA subtitle C landfills were 18.6 million pounds (4.2 percent of total releases), underground injection of lead and lead compounds was 6.0 million pounds to Class II-V wells and 206,138 pounds to Class I wells. Air emissions were 1.6 million pounds and surface water discharges were 413,420 pounds.

Waste Management Data, 2001

Quantities of TRI Chemicals in Waste

The total amount of lead (from both lead metal and lead compounds) reported as being in production-related waste in 2001 was 1.23 billion pounds, as shown in Table 3-33. Over 78 percent of this quantity of lead was reported as having come from lead compounds.

Over 44 percent (543.7 million pounds) of the lead and lead compounds in total production-related waste was recycled on-site (see Figure 3-5). An additional 258.8 million pounds (21.0 percent) was recycled off-site. Over one-third of the lead and lead compounds in production-related waste (428.7 million pounds) was released on- and off-site in 2001. Other types of waste management accounted for less than one percent of the total.

Transfers Off-site for Further Waste Management, including Disposal

Transfers off-site for further waste management, including disposal, of lead and lead compounds totaled 320.2 million pounds in 2001 (see Table 3-34). Transfers of lead compounds accounted for 78.7 percent of the total.

Transfers to recycling were 255.5 million pounds or 79.8 percent of all transfers for further waste management, including disposal, and other transfers off-site to disposal were 64.6 million pounds or 20.2 percent (see Figure 3-6). Other types of transfers off-site for further waste management, including disposal, of lead and lead compounds totaled less than one percent of the total for 2001.

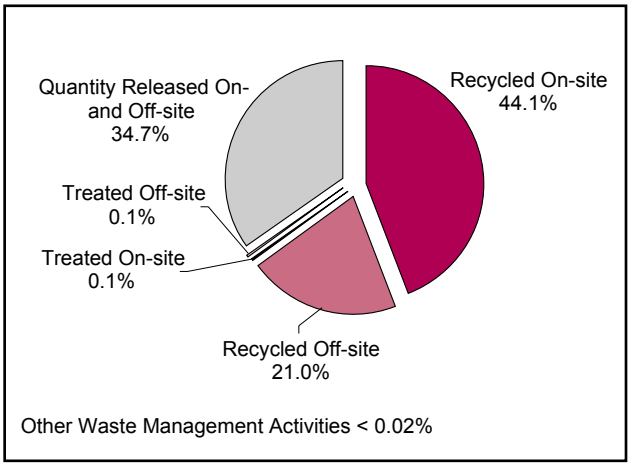
TRI Data by State

Facilities in California and Ohio submitted more than 600 forms each for lead and lead compounds in 2001. These two states submitted more forms for lead and compounds than any other state. Pennsylvania, Texas and Illinois each submitted more than 400 forms.

On- and Off-site Releases

In 2001, facilities in Alaska reported the largest total on- and off-site releases of lead and lead compounds (see Table 3-35). They reported a total of 145.2 million pounds, or almost one-third of the total for lead and lead compounds in 2001. Facilities in Utah reported the second largest amount, 95.2 million pounds or 21.5 percent.

Figure 3-5: Distribution of Quantities of TRI Chemicals in Waste, 2001: Lead and Lead Compounds



Note: Data are from Section 8 of Form R.

Almost all of Alaska's releases of lead and lead compounds were as other on-site land releases (that is, other than RCRA subtitle C landfills). Such releases for Alaska were 139.2 million pounds or 38.6 percent of all such on-site land releases of lead and lead compounds in 2001. Alaska also reported 6.0 million pounds of underground injection to Class II-V wells, almost all of the underground injection releases reported in 2001.

New Jersey facilities reported the largest amount of off-site releases (transfers to disposal) of any state, with 18.8 million pounds or 34.0 percent of total off-site releases of lead and lead compounds in 2001. Missouri facilities reported the largest air emissions, with 442,978 pounds or 27.1 percent of

Table 3-33: Quantities of TRI Chemicals in Waste, 2001: Lead and Lead Compounds

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
7439-92-1	Lead	182,687,811.78	62,367,170.76	8,326.00	11,306.00	1,196,232.44	240,541.13	21,275,297.20	267,786,685.31	289,096.40
--	Lead compounds	360,989,109.10	196,407,911.20	87,739.61	107,719.67	63,447.09	761,998.55	407,376,182.37	965,794,107.59	18,044,639.60
	Total	**543,676,920.88**	**258,775,081.96**	**96,065.61**	**119,025.67**	**1,259,679.53**	**1,002,539.67**	**428,651,479.57**	**1,233,580,792.90**	**18,333,736.00**

Note: Data are from Section 8 of Form R.

all air emissions of lead and lead compounds in 2001.

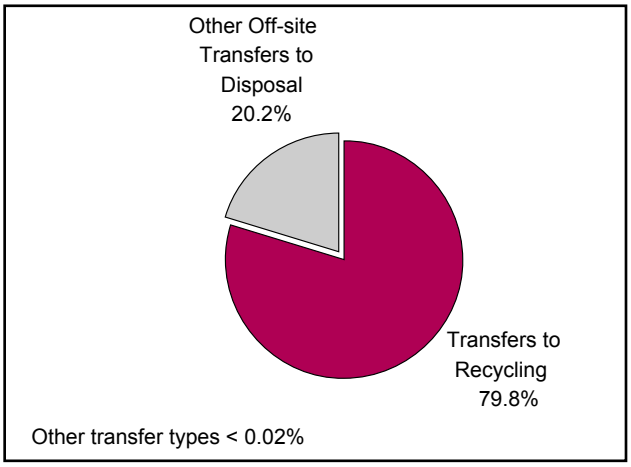
As shown in Map 3-2, releases of lead and lead compounds are quite concentrated geographically. The top two states, Alaska and Utah, released 240.4 million pounds of the 443.0 million-pound total. Facilities in Nevada and Missouri released the next largest amounts of lead and lead compounds: each released between 30 and 40 million pounds, about one-quarter of the amount released by Alaska and 40 percent of the amount released by Utah, the state with the second largest releases.

Waste Management Data

The state with the largest quantity of total production-related waste of lead and lead compounds in 2001 was Missouri (see Table 3-36). Missouri's 190.1 million pounds of total production-related waste accounted for 15.4 percent of the total. Minnesota ranked second with 148.6 million pounds (12.1 percent of the total), and Alaska ranked third with 145.0 million pounds (11.8 percent of the total).

Minnesota, the second-ranked state for lead and lead compounds in production-related waste, reported the largest amount of lead and lead compounds recycled on-site, 145.1 million pounds or 26.7 percent of all on-site recycling. Missouri, the top ranked for total production-related waste, reported the second largest amount recycled on-site, with 141.2 million pounds or 26.0 percent of all on-site recycling. Together these two states reported more than half of all on-site recycling of lead and lead compounds in 2001.

Figure 3-6: Distribution of TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Lead and Lead Compounds



Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.

Alaska reported the largest quantity of lead and lead compounds released on- and off-site in 2001, almost 144.9 million pounds or 33.8 percent of all lead and lead compounds releases in 2001. Utah reported the second largest quantity released on- and off-site, 94.6 million pounds or 22.1 percent.

TRI Data by Industry

On- and Off-site Releases

Metal mining facilities reported the largest total releases of lead and lead compounds in 2001, 335.4 million pounds or 75.7 percent of the total on- and

Table 3-34: TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Lead and Lead Compounds

CAS Number	Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs: Metals and Metal Category Compounds Pounds	Transfers to POTWs: Non-metal TRI Chemicals Pounds	Other Off-site Transfers* Pounds	Other Off-site Transfers to Disposal** Pounds	Total Transfers for Further Waste Management, including Disposal Pounds
7439-92-1	Lead	61,903,264.25	473.99	12,123.68	18,798.10	0.00	9,938.44	6,212,706.53	68,157,304.99
--	Lead compounds	193,631,495.88	7,455.80	11,296.80	30,150.46	0.00	4,518.09	58,396,721.76	252,081,638.79
	Total	**255,534,760.13**	**7,929.79**	**23,420.48**	**48,948.57**	**0.00**	**14,456.53**	**64,609,428.29**	**320,238,943.78**

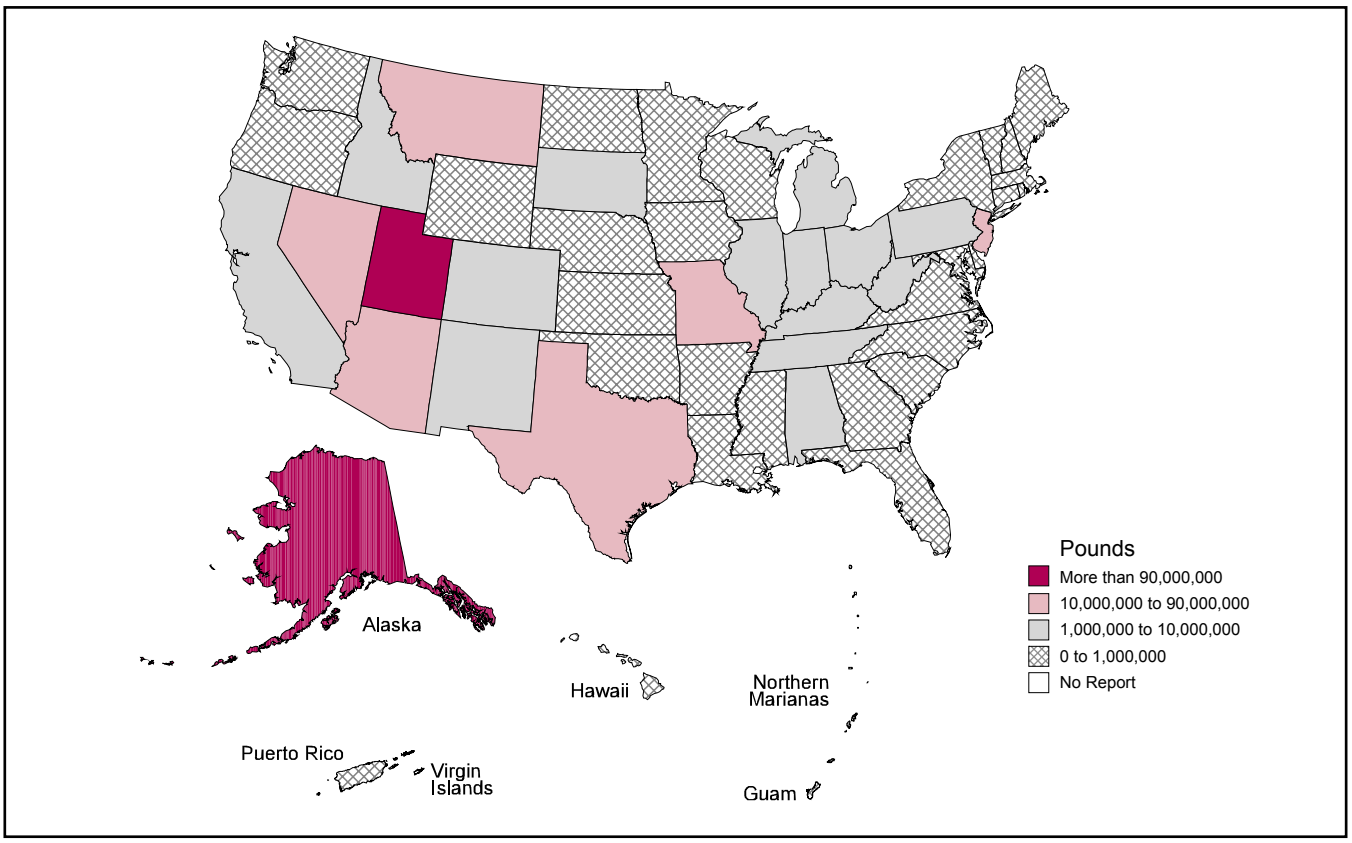
Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

Table 3-35: TRI On-site and Off-site Releases, by State, 2001: Lead and Lead Compounds

State	Total Forms	On-site Releases							Off-site Releases	Total On- and Off-site Releases
				Underground Injection		On-site Land Releases				
		Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	
	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	217	42,763.07	6,519.26	0.00	6,900.00	970,000.00	897,205.65	1,923,387.98	404,317.32	2,327,705.31
Alaska	20	11,733.10	126.40	0.00	6,000,000.00	0.00	139,186,450.40	145,198,309.90	1,162.30	145,199,472.20
Arizona	106	31,848.65	7.01	0.00	0.00	1,736.45	11,179,647.08	11,213,239.19	66,571.18	11,279,810.37
Arkansas	116	28,458.61	1,592.75	0.00	0.00	38,013.70	100,970.87	169,035.94	533,107.40	702,143.34
California	617	35,478.68	927.47	0.00	8.40	5,916,945.31	542,240.29	6,495,600.15	185,742.53	6,681,342.68
Colorado	102	32,837.26	286.57	0.00	0.00	17,937.50	3,875,220.67	3,926,282.00	93,042.12	4,019,324.12
Connecticut	149	3,391.52	607.55	0.00	0.00	0.00	1,258.05	5,257.12	718,548.80	723,805.92
Delaware	20	3,811.01	3,566.90	0.00	0.00	0.00	21,453.00	28,830.91	59,114.44	87,945.35
District of Columbia	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	956.70	956.70
Florida	233	25,984.32	1,369.53	0.00	0.00	17,829.60	405,161.25	450,344.70	287,361.46	737,706.16
Georgia	204	32,908.27	2,403.98	0.00	0.01	0.00	591,967.76	627,280.01	82,433.46	709,713.48
Guam	6	31.00	1.00	0.00	0.00	0.00	5,514.30	5,546.30	0.00	5,546.30
Hawaii	24	5,171.60	20.50	0.00	4.28	0.00	77,022.00	82,218.38	5,256.32	87,474.70
Idaho	43	2,114.97	1,294.98	0.00	0.00	3,503,180.00	3,440,272.35	6,946,862.30	71,774.15	7,018,636.45
Illinois	438	49,707.60	5,435.64	0.00	0.00	1,500,380.10	423,937.22	1,979,460.57	732,786.66	2,712,247.23
Indiana	388	55,968.98	256,269.55	1,300.00	139.90	1,006.00	1,003,819.20	1,318,503.63	3,365,542.17	4,684,045.80
Iowa	117	31,777.83	2,080.88	0.00	0.00	0.00	146,756.26	180,614.96	217,779.50	398,394.46
Kansas	87	31,916.87	28.98	0.00	0.00	0.00	112,668.50	144,614.35	44,020.65	188,634.99
Kentucky	190	34,787.17	8,416.28	0.00	0.55	0.00	1,064,819.30	1,108,023.30	143,322.87	1,251,346.17
Louisiana	101	42,666.63	10,433.28	0.00	0.00	250,001.00	407,654.95	710,755.85	141,110.56	851,866.41
Maine	51	2,108.68	1,808.28	0.00	0.00	0.00	6,515.70	10,432.66	297,291.99	307,724.65
Maryland	66	6,186.45	1,127.91	0.00	111.00	0.00	117,887.80	125,313.16	82,572.82	207,885.98
Massachusetts	255	2,551.59	32.70	0.00	0.00	452.02	5,588.03	8,624.34	302,429.60	311,053.94
Michigan	333	44,664.38	5,122.51	2.00	0.00	405,568.28	236,912.30	692,269.46	1,154,842.59	1,847,112.05
Minnesota	159	18,794.84	806.18	0.00	0.00	0.00	183,037.06	202,638.08	476,125.75	678,763.83
Mississippi	126	11,938.39	1,223.53	188,000.00	0.00	4,197.00	132,178.67	337,537.59	60,133.89	397,671.48
Missouri	204	442,978.38	3,786.42	0.00	0.00	44,269.00	27,918,861.47	28,409,895.27	3,534,045.28	31,943,940.55
Montana	26	7,241.08	373.20	0.00	10,813.00	0.00	14,137,538.70	14,155,965.98	748,749.58	14,904,715.56
Nebraska	65	15,597.05	100.81	0.00	0.00	0.00	84,026.23	99,724.08	47,120.65	146,844.74
Nevada	58	5,607.14	48.00	0.00	0.10	1,247,647.00	36,740,319.30	37,993,621.54	1,126.95	37,994,748.49
New Hampshire	74	352.09	116.10	0.00	0.00	0.00	412.00	880.19	49,775.47	50,655.66
New Jersey	183	9,087.54	797.45	0.00	0.00	4,912.10	40,932.24	55,729.33	18,774,307.45	18,830,036.78
New Mexico	37	4,098.27	50.70	0.00	0.00	0.00	7,131,885.30	7,136,034.27	39,169.47	7,175,203.73
New York	293	31,988.54	18,103.84	0.00	0.00	7,587.99	128,164.63	185,844.99	345,301.90	531,146.89
North Carolina	298	21,161.13	2,387.20	0.00	0.00	250.00	571,755.54	595,553.87	394,694.76	990,248.63
North Dakota	17	8,350.25	451.60	0.00	0.00	0.00	105,540.60	114,342.45	76,440.90	190,783.35
Northern Marianas	3	3.00	0.00	0.00	0.00	0.00	1.80	4.80	0.00	4.80
Ohio	601	91,216.91	5,746.63	15,000.00	0.00	2,243,405.13	806,775.13	3,162,143.79	3,039,116.87	6,201,260.67
Oklahoma	101	14,152.97	279.41	562.00	0.00	408,824.00	32,746.41	456,564.79	81,653.81	538,218.60
Oregon	109	7,720.61	3,106.74	0.00	0.00	786,190.79	96,045.92	893,064.06	41,780.91	934,844.96
Pennsylvania	480	87,374.40	6,318.16	0.00	0.00	243,930.30	900,485.04	1,238,107.90	3,401,219.74	4,639,327.65
Puerto Rico	43	9,904.60	424.30	0.00	0.00	0.00	8,669.50	18,998.40	6,653.04	25,651.44
Rhode Island	57	464.46	14.00	0.00	0.00	0.00	0.00	478.46	12,072.72	12,551.18
South Carolina	174	21,657.20	1,734.82	0.00	0.00	1,579.00	311,112.32	336,083.34	354,420.89	690,504.23
South Dakota	37	1,586.35	631.61	0.00	8,700.00	0.00	2,986,703.50	2,997,621.46	1,371.46	2,998,992.92
Tennessee	207	37,493.83	5,906.22	0.00	0.00	156.00	6,230,820.28	6,274,376.33	759,411.60	7,033,787.94
Texas	455	101,192.30	4,946.44	1,274.00	0.00	357,618.30	1,270,500.19	1,735,531.24	12,638,803.93	14,374,335.17
Utah	67	8,176.67	439.70	0.00	0.00	626,767.00	94,449,800.80	95,085,184.16	130,691.52	95,215,875.68
Vermont	18	295.58	2.00	0.00	0.00	178.00	0.30	475.88	22,721.86	23,197.74
Virgin Islands	4	603.00	0.00	0.00	0.00	0.00	53.00	656.00	394.00	1,050.00
Virginia	208	44,927.13	5,733.69	0.00	0.00	826.00	368,092.84	419,579.66	569,987.92	989,567.58
Washington	152	7,793.82	6,930.86	0.00	6.10	4,731.93	240,068.42	259,531.12	166,372.75	425,903.88
West Virginia	77	15,314.37	27,986.61	0.00	0.00	100.00	1,861,510.42	1,904,911.40	156,499.43	2,061,410.83
Wisconsin	318	42,136.08	3,969.51	0.00	0.00	3,979.65	78,229.97	128,315.21	353,122.14	481,437.35
Wyoming	25	5,045.45	1,524.17	0.00	0.00	0.00	142,464.89	149,034.51	18,096.70	167,131.21
Total	**8,561**	**1,633,121.66**	**413,419.80**	**206,138.00**	**6,026,683.34**	**18,610,199.14**	**360,809,675.39**	**387,699,237.33**	**55,292,470.94**	**442,991,708.27**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Map 3-2: Total On- and Off-site Releases, 2001: Lead and Lead Compounds



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

off-site releases (see Table 3-37). Metal mining facilities reported the largest other on-site land releases (that is, land releases other than RCRA subtitle C landfills), with 329.3 million pounds or 91.3 percent of all such releases. They also reported almost all of the on-site underground injection releases.

The primary metals industry, which includes primary and secondary smelting and refining of metals, reported the second largest total releases. Their 44.3 million pounds of releases accounted for 10.0 percent of total releases of lead and lead compounds in 2001. Primary metals facilities reported the largest off-site releases (transfers to disposal) of lead and lead compounds, with 25.5 million pounds or 46.0 percent of all off-site releases.

The hazardous waste/solvent recovery industries reported the third largest total releases, with 23.3 million pounds or 5.3 percent of the total releases of lead and lead compounds in 2001. They reported the largest on-site releases to RCRA subtitle C landfills of any industry sector, with 18.0 million pounds or 96.6 percent of all such releases of lead and lead compounds.

Waste Management

The primary metals industry reported the largest amount of lead and lead compounds in production-related waste in 2001 (see Table 3-38). With 442.4 million pounds of lead and lead compounds in production-related waste, it accounted for 35.9 percent of the total. Over 83 percent of the production-related waste reported by the primary metals industry was recycled on-site.

Table 3-36: Quantities of TRI Chemicals in Waste, by State, 2001: Lead and Lead Compounds

State	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
Alabama	16,880,973.00	4,217,110.97	0.00	0.00	1,203.00	553.00	2,574,038.89	23,673,878.86	6,611.50
Alaska	31.00	0.00	0.00	98,000.00	0.00	0.90	144,895,523.10	144,993,555.00	17.00
Arizona	2,237,341.00	927,899.13	0.00	0.00	0.00	2,071.00	11,243,590.13	14,410,901.26	1,934.80
Arkansas	1,919,821.00	4,934,245.49	0.00	2.00	93.14	57,905.80	1,801,607.57	8,713,675.00	139,401.60
California	13,423,943.09	16,982,406.16	86,586.00	0.00	1,172,649.88	54,454.06	7,162,098.59	38,882,137.78	31,282.13
Colorado	73,442.00	3,463,637.35	0.00	0.00	52.20	2.00	4,088,841.00	7,625,974.55	7,067.45
Connecticut	8,474.42	843,447.17	0.00	10.00	56.00	13,120.83	720,523.32	1,585,631.73	69,072.98
Delaware	0.00	4,567,417.70	0.00	0.00	0.00	0.00	88,328.24	4,655,745.94	0.00
District of Columbia	30.00	4,500.00	0.00	0.00	3.00	0.00	333.00	4,866.00	0.00
Florida	46,579.00	7,043,126.37	0.00	0.00	10.00	2,172.13	676,249.98	7,768,137.49	17,612.64
Georgia	1,365,679.85	11,036,626.58	0.00	35.00	25.00	1,504.10	729,326.51	13,133,197.04	5,149.10
Guam	0.00	0.00	0.00	0.00	0.00	0.00	5,546.30	5,546.30	0.00
Hawaii	115.00	16,844.20	0.00	0.00	0.00	0.00	130,492.60	147,451.80	0.00
Idaho	4,332.00	453,122.02	0.00	0.00	0.00	1.00	7,037,753.00	7,495,208.02	3,796.17
Illinois	356,705.36	10,483,124.47	0.00	0.00	3.20	38,256.40	3,405,959.27	14,284,048.71	11,728.75
Indiana	12,499,604.23	11,397,775.98	0.00	582.00	215.37	28,481.32	4,660,934.32	28,587,593.21	42,201.71
Iowa	12,823,978.90	19,069,065.95	0.00	0.00	19,960.00	832.30	975,806.32	32,889,643.47	1,675.55
Kansas	31,544,413.29	8,088,433.35	0.00	0.00	70.00	1,555.10	188,466.38	39,822,938.12	12,789.00
Kentucky	5,404,966.90	8,390,280.00	0.00	5,209.00	666.00	82,280.50	1,235,638.16	15,119,040.56	1,565.53
Louisiana	20,923,510.48	9,005,492.27	0.00	12.00	1,284.36	61.00	865,186.98	30,795,547.09	4,950.00
Maine	0.00	35,524.68	0.00	0.00	1,000.00	0.10	25,853.36	62,378.14	4,026.00
Maryland	5,526.00	288,389.05	0.00	0.00	0.00	313.00	187,566.31	481,794.36	11.00
Massachusetts	8,111.57	640,001.91	0.00	0.00	60.00	32,021.26	297,737.84	977,932.58	578.45
Michigan	1,099,544.40	2,256,668.33	0.00	238.00	1,463.90	2,235.58	1,820,067.03	5,180,217.24	8.80
Minnesota	145,090,104.63	2,904,550.01	0.00	0.00	0.00	0.00	648,885.42	148,643,540.06	36,102.00
Mississippi	7,990,926.00	7,960,901.30	0.00	0.00	36.00	147.00	420,637.23	16,372,647.53	15,890.00
Missouri	141,212,460.40	17,036,732.88	0.00	0.00	498.40	2,974.20	31,831,008.68	190,083,674.56	18,846.00
Montana	4,626,849.00	0.00	0.00	0.00	130.70	9.29	7,029,504.42	11,656,493.41	5,679,627.00
Nebraska	25.10	312,645.07	0.00	0.00	0.00	34,061.20	1,323,823.33	1,670,554.70	0.00
Nevada	1,571,119.90	677,699.40	0.00	0.00	289.00	8.94	37,984,722.33	40,233,839.57	50.00
New Hampshire	28,615.40	417,982.64	0.00	0.00	0.20	1,450.40	40,932.04	488,980.68	27,636.75
New Jersey	42,771.80	3,057,369.38	0.00	89.40	12,000.00	47,272.47	3,255,771.96	6,415,275.01	3,127.94
New Mexico	0.00	111,935.10	0.00	0.00	0.00	0.00	7,282,224.63	7,394,159.73	13,937.00
New York	6,674,447.01	5,463,899.77	119.00	3.31	69.00	23,266.40	674,231.21	12,836,035.70	31,171.90
North Carolina	130,451.29	20,599,652.73	1,153.61	1,152.96	640.00	5,207.20	975,154.91	21,713,412.71	4,731.65
North Dakota	0.00	3,646.00	0.00	0.00	0.00	0.00	190,415.07	194,061.07	0.00
Northern Marianas	0.00	0.00	0.00	0.00	0.00	0.00	4.80	4.80	0.00
Ohio	58,920,072.65	11,359,341.33	0.00	1,174.00	171.50	4,969.63	6,778,468.62	77,064,197.73	11,599.30
Oklahoma	164,370.40	1,922,782.12	0.00	3.00	4,283.00	16.42	589,256.59	2,680,711.53	12,640.21
Oregon	5,164.59	4,339,233.18	0.00	0.00	1,506.70	503.63	1,623,141.39	5,969,549.48	992.02
Pennsylvania	42,726,955.80	10,636,192.45	0.00	0.00	21,172.20	59,919.93	5,621,165.71	59,065,406.09	72,369.59
Puerto Rico	2.00	107,164.16	0.00	0.00	1.00	153.51	57,425.55	164,746.22	0.00
Rhode Island	340,100.20	79,895.31	0.00	0.00	24.00	3,009.00	11,554.70	434,583.21	0.00
South Carolina	50,270.00	5,364,629.31	0.00	3,400.00	161.56	43,065.18	4,758,489.84	10,220,015.89	30,421.29
South Dakota	20.00	788,000.72	0.00	0.00	0.00	1.00	2,999,860.03	3,787,881.75	712.00
Tennessee	10,213,746.50	26,767,580.30	0.00	686.00	1,965.00	1,357.99	7,014,707.86	44,000,043.65	1,518.01
Texas	2,662,036.39	4,273,973.18	8,207.00	2,758.00	2,148.00	445,844.87	14,526,652.27	21,921,619.71	11,010,715.40
Utah	376.50	167,257.72	0.00	0.00	7,479.86	107.29	94,640,991.47	94,816,212.84	976,041.30
Vermont	636.00	856,836.00	0.00	0.00	0.00	183.90	23,370.04	881,025.94	0.00
Virgin Islands	0.00	131.00	0.00	0.00	0.00	0.00	1,054.00	1,185.00	0.00
Virginia	41,613.60	957,727.70	0.00	3,267.00	4,752.00	293.84	989,667.80	1,997,321.94	2,193.40
Washington	14,718.50	1,053,165.56	0.00	520.00	953.80	3,411.07	483,354.59	1,556,123.52	17,691.09
West Virginia	6,756.90	137,995.95	0.00	0.00	2,477.10	771.00	1,167,664.69	1,315,665.64	3,842.00
Wisconsin	535,187.82	7,271,016.56	0.00	1,884.00	105.30	6,712.93	520,679.39	8,335,586.00	400.00
Wyoming	0.00	6.00	0.00	0.00	0.16	0.00	369,190.82	369,196.98	0.00
Total	**543,676,920.88**	**258,775,081.96**	**96,065.61**	**119,025.67**	**1,259,679.53**	**1,002,539.67**	**428,651,479.57**	**1,233,580,792.90**	**18,333,736.00**

Note: Data are from Section 8 of Form R.

Table 3-37: TRI On-site and Off-site Releases, by Industry, 2001: Lead and Lead Compounds

			On-site Releases							Off-site Releases	Total
					Underground Injection		On-site Land Releases				
SIC Code	Industry	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
10	Metal Mining	78	141,379.61	3,939.96	0.00	6,019,513.10	0.00	329,252,815.95	335,417,648.62	8,277.85	335,425,926.47
12	Coal Mining	62	106.23	26,081.10	0.00	7,150.90	0.00	1,202,021.57	1,235,359.80	10,773.30	1,246,133.10
20	Food	67	15,907.62	624.00	0.00	0.00	0.00	6,078.72	22,610.34	26,673.30	49,283.64
21	Tobacco	4	113.20	16.10	0.00	0.00	0.00	0.00	129.30	7,331.00	7,460.30
22	Textiles	32	3,950.22	13.22	0.00	0.00	0.00	2,350.57	6,314.01	26,433.69	32,747.70
23	Apparel	2	0.00	0.00	0.00	0.00	0.00	75.00	75.00	0.00	75.00
24	Lumber	372	26,547.46	198.20	0.00	0.00	0.01	38,504.29	65,249.96	17,723.66	82,973.61
25	Furniture	105	4,160.73	476.10	0.00	0.00	0.00	26.69	4,663.53	14,036.57	18,700.10
26	Paper	244	38,616.55	29,625.15	0.00	0.00	4.60	271,474.91	339,721.20	128,076.72	467,797.92
27	Printing	39	52.64	0.00	0.00	0.00	0.00	408.00	460.64	32,680.22	33,140.86
28	Chemicals	523	37,976.05	7,754.94	188,003.00	0.00	5,476.33	1,483,776.10	1,722,986.42	18,278,880.19	20,001,866.61
29	Petroleum	177	33,245.71	3,529.40	0.00	8.40	0.00	8,735.78	45,519.29	61,097.16	106,616.46
30	Plastics	306	15,627.62	253.03	0.00	0.00	7,394.00	7,441.61	30,716.26	131,503.75	162,220.01
32	Stone/Clay/Glass	586	164,210.75	476.59	0.00	6.65	400.70	659,454.41	824,549.10	1,329,351.03	2,153,900.12
33	Primary Metals	1,047	683,842.13	271,089.65	2,626.00	0.00	507,879.56	17,425,713.26	18,891,150.59	25,457,150.43	44,348,301.03
34	Fabricated Metals	957	27,045.92	2,143.94	0.00	0.00	54,853.00	36,980.43	121,023.29	494,118.57	615,141.86
35	Machinery	301	28,049.94	30.04	0.00	0.00	3.98	1,068.82	29,152.78	81,184.56	110,337.34
36	Electrical Equip.	1,252	49,317.60	1,983.71	0.00	0.00	4,213.36	1,777.81	57,292.47	1,440,503.19	1,497,795.66
37	Transportation Equip.	395	31,227.17	908.61	0.00	0.00	204.78	2,756.31	35,096.87	546,544.27	581,641.14
38	Measure/Photo.	174	8,582.78	1,053.33	0.00	0.00	250.00	577.10	10,463.21	46,198.74	56,661.95
39	Miscellaneous	72	857.08	62.97	0.00	0.00	26.00	374.00	1,320.05	27,193.21	28,513.26
--	Multiple codes 20-39	520	44,853.83	11,529.08	0.00	0.01	649.45	271,667.66	328,700.04	653,796.71	982,496.75
--	No codes 20-39	231	55,698.90	1,690.65	0.00	0.00	3,883.60	2,034,968.72	2,096,241.87	291,617.92	2,387,859.79
491/493	Electric Utilities	557	208,763.62	49,553.07	0.00	4.28	50,348.40	7,408,031.13	7,716,700.51	1,595,902.83	9,312,603.34
5169	Chemical Wholesale Distributors	12	20.00	0.00	0.00	0.00	5.00	0.00	25.00	4,214.60	4,239.60
5171	Petroleum Terminals/Bulk Storage	275	402.68	46.88	0.00	0.00	0.00	491.00	940.56	5,358.82	6,299.38
7389/4953	Hazardous Waste/Solvent Recovery	171	12,565.60	340.10	15,509.00	0.00	17,974,606.38	692,105.55	18,695,126.63	4,575,848.63	23,270,975.26
	Total	**8,561**	**1,633,121.66**	**413,419.80**	**206,138.00**	**6,026,683.34**	**18,610,199.14**	**360,809,675.39**	**387,699,237.33**	**55,292,470.94**	**442,991,708.27**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

The metal mining industry reported the second largest amount of lead and lead compounds in production-related waste, with 335.6 million pounds or 27.2 percent of the total for lead and lead compounds in 2001. Over 99.0 percent of the lead and lead compounds in production-related waste reported by the metal mining industry (332.3 million pounds) was released on- and off-site.

The electrical equipment manufacturers reported the third largest amount of lead and lead compounds in production-related waste, with 278.0 million pounds. This industry reported the largest amount recycled off-site, with 190.9 million pounds. Off-site recycling by the electrical equipment industry accounted for 68.6 percent of that industry's lead and lead compounds in production-related waste.

Projected Quantities of TRI Chemicals Managed in Waste, 2001-2003

TRI facilities expected to decrease their quantities of lead and lead compounds in production-related waste between 2001 and 2003 by 14.9 percent, from 1.23 billion pounds to 1.05 million pounds (see Table 3-39). The decrease was projected to occur mainly in quantities released on- and off-site, which was expected to decline by 40.4 percent. The amount recycled on-site was expected to increase by 0.5 percent. On- and off-site releases are the least-desirable outcome under the waste management hierarchy described in **Waste Management** in Chapter 1 (Figure 1-2).

From 2001 to 2002, a decrease of 11.9 percent was projected, followed by a decrease of 3.3 percent from 2002 to 2003. On- and off-site releases were

Table 3-38: Quantities of TRI Chemicals in Waste, by Industry, 2001: Lead and Lead Compounds

SIC Code	Industry	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
10	Metal Mining	2,404,329.90	736,901.30	0.00	98,000.00	0.00	1.90	332,319,753.87	335,558,986.97	444,869.28
12	Coal Mining	0.00	5.00	0.00	0.00	118.00	0.00	1,236,744.88	1,236,867.88	13,615.00
20	Food	0.00	1,440.90	0.00	0.00	313.00	0.00	54,905.17	56,659.07	983.00
21	Tobacco	0.00	0.00	0.00	0.00	0.00	0.00	7,464.30	7,464.30	0.00
22	Textiles	0.00	3,000.00	0.00	871.00	0.00	0.00	29,513.92	33,384.92	21.57
23	Apparel	0.00	0.00	0.00	0.00	0.00	0.00	75.00	75.00	0.00
24	Lumber	4,061.18	29,460.20	280.00	0.00	1,413.06	122.30	82,421.90	117,758.65	1,394.11
25	Furniture	0.00	27,298.58	1,153.61	117.28	5.00	77.29	33,050.19	61,701.95	197.00
26	Paper	79.20	10,576.38	0.00	0.00	4,461.10	2,792.33	470,299.70	488,208.71	1,521.90
27	Printing	405.00	169,151.46	0.00	1,884.00	0.00	90.13	40,905.48	212,436.07	0.00
28	Chemicals	463,193.11	2,360,384.35	60.00	4,732.40	28,991.06	32,346.79	5,576,401.40	8,466,109.12	9,360.92
29	Petroleum	28,368.99	21,192.97	0.00	168.00	561.00	12,835.79	120,931.74	184,058.49	16,209.01
30	Plastics	396,065.03	653,867.91	0.00	3,553.00	12,130.00	55,917.03	165,001.87	1,286,534.84	47.50
32	Stone/Clay/Glass	82,213,690.99	1,047,595.01	7,986.00	2.00	750.36	91,063.33	2,485,825.27	85,846,912.96	30,799.36
33	Primary Metals	367,579,294.97	28,656,413.15	0.00	0.00	1,184,280.70	528,799.49	44,406,985.06	442,355,773.37	17,496,672.60
34	Fabricated Metals	1,684,526.70	10,321,968.57	0.00	2,167.00	1,978.90	71,994.75	579,979.79	12,662,615.71	48,999.07
35	Machinery	284,005.00	2,716,116.31	0.00	2,601.00	2.00	577.00	113,624.53	3,116,925.84	3,466.89
36	Electrical Equip.	82,104,587.21	190,852,924.02	0.00	2,396.00	2,375.28	51,841.62	5,012,913.83	278,027,037.97	71,608.70
37	Transportation Equip.	2,973,324.90	3,547,916.95	0.00	50.00	7,889.71	3,349.30	399,111.15	6,931,642.01	7,027.37
38	Measure/Photo.	88,117.00	413,288.60	0.00	0.00	0.00	6,761.20	62,957.99	571,124.79	1,118.39
39	Miscellaneous	5,641.00	83,851.46	0.00	0.00	121.50	1,479.03	20,602.82	111,695.82	20.22
--	Multiple codes 20-39	3,055,034.29	14,538,497.78	0.00	1,040.99	1,385.00	32,156.48	1,215,879.99	18,843,994.53	72,318.61
--	No codes 20-39	285,915.00	733,176.44	86,586.00	0.00	4,574.00	6,352.60	2,298,460.92	3,415,064.96	70,005.14
491/493	Electric Utilities	104,460.00	70,393.34	0.00	0.00	8.00	19,453.44	8,474,178.31	8,668,493.09	34,136.30
5169	Chemical Wholesale Distributors	0.00	3,893.00	0.00	0.00	0.00	0.00	4,847.62	8,740.62	0.00
5171	Petroleum Terminals/Bulk Storage	2.40	2,031.37	0.00	856.00	0.00	721.98	3,376.36	6,988.11	1,195.10
7389/4953	Hazardous Waste/Solvent Recovery	1,819.00	1,773,736.90	0.00	587.00	8,321.86	83,805.89	23,435,266.51	25,303,537.16	8,148.96
	Total	**543,676,920.88**	**258,775,081.96**	**96,065.61**	**119,025.67**	**1,259,679.53**	**1,002,539.67**	**428,651,479.57**	**1,233,580,792.90**	**18,333,736.00**

Note: Data are from Section 8 of Form R.

Table 3-39: Current Year and Projected Quantities of TRI Chemicals in Waste, 2001-2003: Lead and Lead Compounds

Waste Management Activity	Current Year 2001		Projected 2002		Projected 2003	
	Total Pounds	Percent of Total	Total Pounds	Percent of Total	Total Pounds	Percent of Total
Recycled On-site	543,676,920.88	44.1	541,666,969.44	49.8	546,160,068.02	52.0
Recycled Off-site	258,775,081.96	21.0	252,493,370.99	23.2	246,258,917.95	23.4
Energy Recovery On-site	96,065.61	0.0	125,776.60	0.0	125,776.60	0.0
Energy Recovery Off-site	119,025.67	0.0	146,694.41	0.0	146,707.52	0.0
Treated On-site	1,259,679.53	0.1	1,380,087.43	0.1	1,380,070.17	0.1
Treated Off-site	1,002,539.67	0.1	768,525.23	0.1	739,679.95	0.1
Quantity Released On- and Off-site	428,651,479.57	34.7	290,029,510.17	26.7	255,524,312.44	24.3
Total Production-related Waste Managed	**1,233,580,792.90**	**100.0**	**1,086,610,934.28**	**100.0**	**1,050,335,532.66**	**100.0**
Waste Management Activity	**Projected Change 2001-2002** Percent		**Projected Change 2002-2003** Percent		**Projected Change 2001-2003** Percent	
Recycled On-site	-0.4		0.8		0.5	
Recycled Off-site	-2.4		-2.5		-4.8	
Energy Recovery On-site	30.9		0.0		30.9	
Energy Recovery Off-site	23.2		0.0		23.3	
Treated On-site	9.6		0.0		9.6	
Treated Off-site	-23.3		-3.8		-26.2	
Quantity Released On- and Off-site	-32.3		-11.9		-40.4	
Total Production-related Waste Managed	**-11.9**		**-3.3**		**-14.9**	

Note: Data from Section 8 of Form R for 2001.

Table 3-40: Number of Forms Reporting Source Reduction Activity, by Category, 2001: Lead and Lead Compounds

CAS Number	Chemical	Total Form Rs	Forms Reporting Source Reduction Activity		Category of Source Reduction Activity							
				Percent of All Form Rs	Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Materials Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
		Number	Number	Percent	Number	Number	Number	Number	Number	Number	Number	Number
7439-92-1	Lead	4,201	561	13.4	190	38	45	90	110	18	24	46
--	Lead compounds	4,360	753	17.3	267	54	85	138	139	10	21	39
	Total	**8,561**	**1,314**	**15.3**	**457**	**92**	**130**	**228**	**249**	**28**	**45**	**85**

Note: All source reduction activities on a form are counted in the corresponding category. Totals do not equal the sum of the categories because forms may report more than one source reduction activity.

projected to decrease by 32.3 percent from 2001 to 2002 and by 11.9 percent from 2002 to 2003.

Source Reduction

In 2001, a total of 1,314 forms were filed reporting source reduction activities for lead and lead compounds (see Table 3-40). As noted in **Waste Management** in Chapter 1, source reduction—an activity that prevents the generation of waste—is preferred to waste management. These 1,314 forms represented 15.3 percent of all forms submitted for lead and lead compounds in 2001.

The most frequently reported source reduction activity was good operating practices (listed on 457 forms). Raw materials modifications came next, with 228 forms, followed by process modifications, with 249 forms, and spill and leak prevention, with 130 forms.

Box 3-3: TRI Data for Lead and Lead Compounds before 2001

Reporting for lead and lead compounds before 2001 was based on the higher TRI thresholds of 25,000 pounds for manufacture or processing of lead or lead compounds and 10,000 pounds for otherwise using lead or lead compounds. For the reporting year 2001, these thresholds were reduced to 100 pounds for manufacture, processing or otherwise using lead or lead compounds. Lowering the threshold to 100 pounds required the reporting of releases of lead or lead compounds by those facilities that did not exceed the previous 25,000 pound and 10,000 pound activity (reporting) thresholds, and did not have to file release reports for lead or lead compounds prior to reporting year 2001. In other words, as a result of the lower reporting threshold, more facilities are now required to report their annual releases and other waste management quantities of lead and lead compounds. While the number of facilities *reporting* releases increased in 2001, and the *reported* release quantities have increased in 2001, the *actual* environmental releases of lead and lead compounds may or may not have increased. Because of the change in the reporting threshold, the release and other waste management quantities reported for 2001 are not comparable with those for prior years, nor are the number of facilities reporting releases for lead and lead compounds.

Following is a brief summary of releases and transfers of lead and lead compounds and lead and lead compounds in production-related waste for 1998, 1999 and 2000.

TRI Data for Lead and Lead Compounds, 1998-2000

	1998	1999	2000	Change 1998-2000	
	Number	Number	Number	Number	Percent
Total Forms	2,017	1,936	2,025	8	0.4
	Pounds	**Pounds**	**Pounds**	**Pounds**	**Percent**
Total On-site Releases	280,170,459	299,698,108	349,880,462	69,710,003	24.9
Off-site Releases (Transfers to Disposal)	26,678,971	28,744,346	24,303,227	-2,375,744	-8.9
Total On- and Off-site Releases	**306,849,431**	**328,442,454**	**374,183,689**	**67,334,259**	**21.9**
Total Production-related Waste Managed	**1,339,127,062**	**1,276,910,365**	**1,305,445,715**	**-33,681,348**	**-2.5**

Lead and lead compounds have been on the TRI chemical list since the list was established in 1986. The following is a summary of releases and transfers for 1988-2000. This table includes only manufacturing industries for 1998 and 2000 since other industries were not required to report to TRI before 1998.

TRI Data for Lead and Lead Compounds, 1988-2000

	1988	1998	1999	2000	Change 1988-2000	
	Number	Number	Number	Number	Number	Percent
Total Forms	1,604	1,708	1,660	1,751	147	9.2
	Pounds	**Pounds**	**Pounds**	**Pounds**	**Pounds**	**Percent**
Total On-site Releases	29,612,313	21,146,970	18,865,189	14,867,850	-14,744,463	-49.8
Off-site Releases (Transfers to Disposal)	28,205,929	34,323,439	31,355,307	31,988,095	3,782,166	13.4
Total On- and Off-site Releases	**57,818,242**	**55,470,409**	**50,220,496**	**46,855,945**	**-10,962,297**	**-19.0**

Mercury and Mercury Compounds

INTRODUCTION

Mercury is a heavy, silver-white metal that exists as a liquid at ambient temperatures. It is a precious metal used in chlor-alkali production, wiring devices, switching mechanisms, amalgam dental fillings, and measurement and control instruments. Industries also manufacture and process mercury reagents, catalysts, and medicinal chemicals. Metal ores, coal, crude oil, and fuel oils contain mercury as a trace constituent.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts", which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds, the most common being methylmercury which is primarily produced by small organisms in the water and soil. Methylmercury has no industrial uses; it is formed in the environment from the methylation of the inorganic mercurial ion. Inorganic mercury compounds have been used in the past in laxatives, skin-lightening creams and soaps, and in latex paint. EPA has banned the use of mercury in paints and pesticides.

More details on mercury and mercury compounds, their sources, chemical characteristics, health and environmental effects and efforts being undertaken to reduce pollution from mercury and mercury compounds can be found in the *2000 Toxics Release Inventory Public Data Release Report* (EPA 260-R-02-003).

2001 TRI DATA FOR MERCURY AND MERCURY COMPOUNDS

On-site and Off-site Releases, 2001

As shown in Table 3-41, there were 1,665 TRI forms submitted for mercury and mercury compounds for 2001. On- and off-site releases of mercury and mercury compounds totaled 4.9 million pounds, with 4.8 million pounds of this reported as mercury compounds. Over 90 percent of total releases of mercury and mercury compounds were other on-site land releases (that is, other than RCRA subtitle C landfills), which totaled 4.5 million pounds (see Figure 3-7). (Types of on-site land releases are described in Box 1-4 in Chapter 1.) The second-largest release type was off-site releases (transfers to disposal), which totaled 228,283 pounds and accounted for 4.7 percent of total releases.

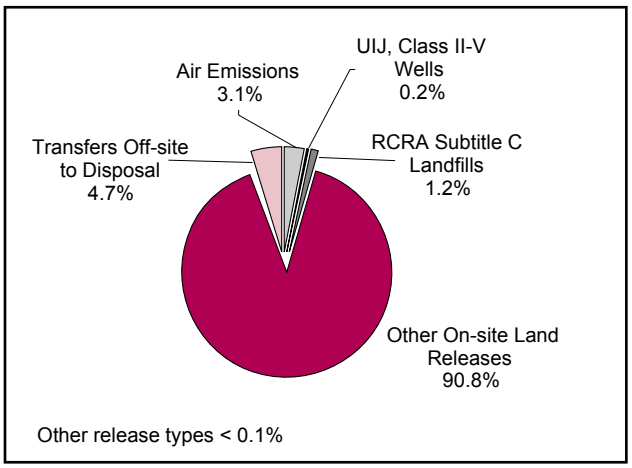
Smaller amounts of other types of releases were reported. Air emissions totaled 150,463 pounds or 3.8 percent of total releases of mercury and mercury compounds in 2001. On-site land releases to RCRA subtitle C landfills were 60,009 pounds and surface water discharges were 1,805 pounds. Underground injection of mercury and mercury compounds was 8,035 pounds to Class II-V wells and 1,741 pounds to Class I wells.

Table 3-41: TRI On-site and Off-site Releases, 2001: Mercury and Mercury Compounds

			On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
CAS Number	Chemical	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
7439-97-6	Mercury	537	24,698.08	341.73	460.40	0.00	19,861.63	11,899.27	57,261.10	76,715.67	133,976.77
--	Mercury compounds	1,128	125,764.77	1,463.42	1,280.71	8,035.04	40,147.21	4,444,081.51	4,620,772.66	151,567.27	4,772,339.93
	Total	**1,665**	**150,462.84**	**1,805.15**	**1,741.11**	**8,035.04**	**60,008.84**	**4,455,980.78**	**4,678,033.75**	**228,282.95**	**4,906,316.70**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Figure 3-7: Distribution of TRI On-site and Off-site Releases, 2001: Mercury and Mercury Compounds



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

UIJ = Underground injection

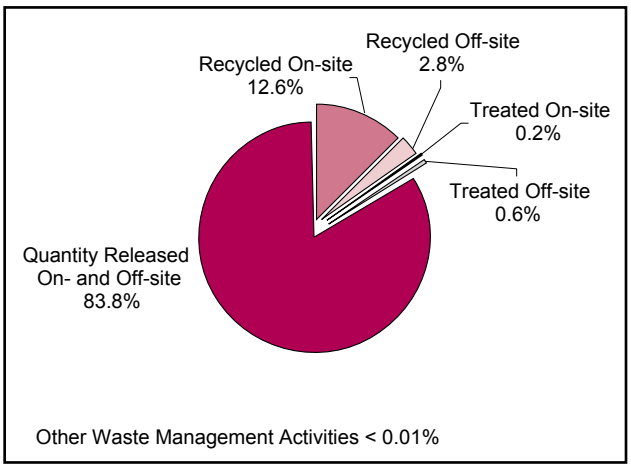
Waste Management Data, 2001

Quantities of TRI Chemicals in Waste

Mercury and mercury compounds in production-related waste totaled 5.8 million pounds in 2001, as shown in Table 3-42. Over 91 percent was reported as mercury compounds.

Almost 83.8 percent (4.9 million pounds) of the mercury and mercury compounds in production-related waste was released on- or off-site (see Figure 3-8). On-site recycling accounted for 12.6 percent, or 735,097 pounds and off-site recycling for 2.8 percent, or 161,542 pounds. Other types of waste management accounted for less than one percent of the total.

Figure 3-8: Distribution of Quantities of TRI Chemicals in Waste, 2001: Mercury and Mercury Compounds



Note: Data are from Section 8 of Form R.

Transfers Off-site for Further Waste Management, including Disposal

Transfers off-site of mercury and mercury compounds for further waste management, including disposal, totaled 409,188 pounds in 2001 (see Table 3-43). Transfers of mercury compounds accounted for 61.1 percent of the total.

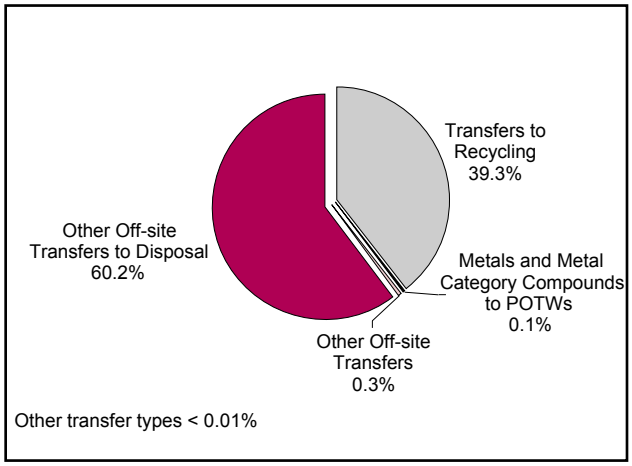
Of the total transfers off-site for further waste management, including disposal, the category other transfers off-site to disposal were 246,409 pounds or 60.2 percent of all transfers for further waste management, including disposal, and transfers to recycling were 160,905 pounds or 39.3 percent (see Figure 3-9). Transfers to treatment, transfers to POTWs of metals and metal category compounds and other off-site transfers totaled 1,875 pounds for 2001.

Table 3-42: Quantities of TRI Chemicals in Waste, 2001: Mercury and Mercury Compounds

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
7439-97-6	Mercury	304,798.30	75,943.07	77.00	1.80	30.21	33,619.33	104,363.91	518,833.63	3,447.20
--	Mercury compounds	430,298.53	85,599.27	0.00	0.00	10,832.75	4,177.47	4,768,795.72	5,299,703.74	12,566.96
	Total	**735,096.83**	**161,542.34**	**77.00**	**1.80**	**10,862.96**	**37,796.80**	**4,873,159.63**	**5,818,537.36**	**16,014.15**

Note: Data are from Section 8 of Form R.

Figure 3-9: Distribution of TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Mercury and Mercury Compounds



Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.

TRI Data by State

Facilities in Pennsylvania and Texas, with 114 and 113 forms respectively, submitted the largest number of forms in 2001 for mercury and mercury compounds. California ranked third with 100 forms.

On- and Off-site Releases

In 2001, facilities in Nevada reported the largest total on- and off-site releases of mercury and mercury compounds (see Table 3-44). They reported a total of 4.2 million pounds, or 85.5 percent of the total for mercury and mercury compounds in 2001. This was almost 40 times the amount of releases from facilities in Alabama, which reported the second largest amount, 107,680 pounds or 2.2 percent.

Almost all of Nevada's releases of mercury and mercury compounds were as other on-site land releases (that is, other than RCRA subtitle C landfills). Such releases for Nevada were 4.2 million pounds or 93.7 percent of all such on-site land releases of mercury and mercury compounds in 2001.

Illinois facilities reported the largest amount of off-site releases (transfers to disposal) of any state, with 58,151 pounds or 25.5 percent of total off-site releases of mercury and mercury compounds in 2001. Texas facilities reported the largest air emissions, with 14,765 pounds or 9.8 percent of all air emissions of mercury and mercury compounds in 2001.

As shown in Map 3-3, releases of mercury and mercury compounds are dominated by Nevada, with the remaining releases spread over a number of states. Three states besides Nevada, Alabama, California and Illinois, each released more than 50,000 pounds, and an additional 14 states each released more than 10,000 pounds.

Waste Management Data

The state with the largest quantity of mercury and mercury compounds in production-related waste of mercury and mercury compounds in 2001 was

Table 3-43: TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Mercury and Mercury Compounds

CAS Number	Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs: Metals and Metal Category Compounds Pounds	Transfers to POTWs: Non-metal TRI Chemicals Pounds	Other Off-site Transfers* Pounds	Other Off-site Transfers to Disposal** Pounds	Total Transfers for Further Waste Management, including Disposal Pounds
7439-97-6	Mercury	74,756.08	0.00	13.00	103.71	0.00	1,392.00	82,958.66	159,223.45
--	Mercury compounds	86,148.48	0.00	0.40	365.89	0.00	0.00	163,449.91	249,964.67
	Total	**160,904.56**	**0.00**	**13.40**	**469.60**	**0.00**	**1,392.00**	**246,408.57**	**409,188.12**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

Nevada (see Table 3-45). Nevada's 4.5 million pounds of mercury and mercury compounds in production-related waste accounted for 76.8 percent of the total, almost 25 times that of any other state. Pennsylvania ranked second with 180,490 pounds and West Virginia ranked third with 135,613 pounds.

Nevada released on- and off-site 4.2 million pounds or 86.0 percent of all mercury and mercury compounds releases in 2001. Alabama reported the second largest quantity released on- and off-site, 108,152 pounds or 2.2 percent.

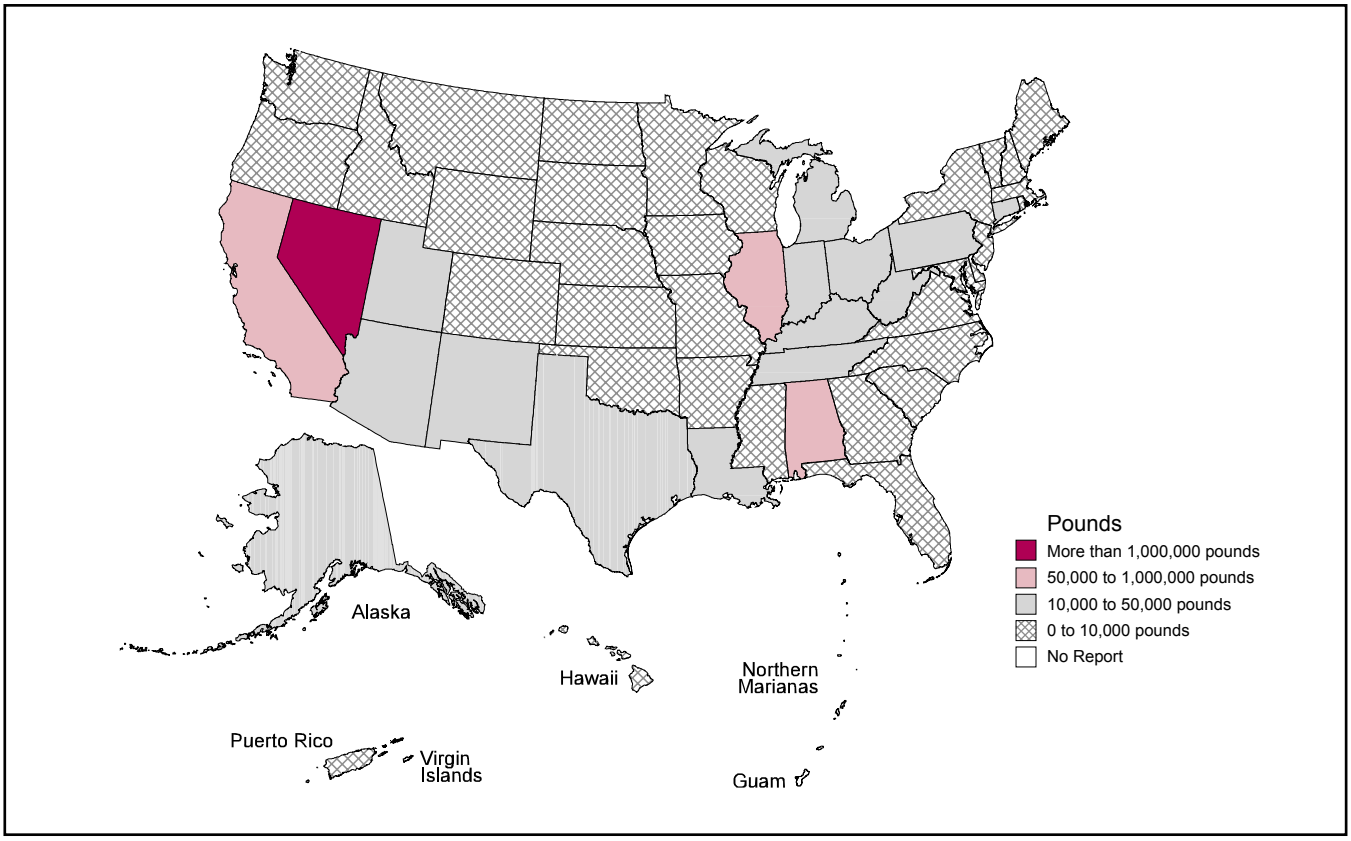
Nevada reported the largest amount of mercury and mercury compounds recycled on-site, 275,782 pounds or 37.5 percent of all on-site recycling. Pennsylvania, the second ranked state for mercury and mercury compounds in production-related waste, reported the second largest amount recycled on-site, with 139,012 pounds or 18.9 percent of all on-site recycling of mercury and mercury compounds in 2001.

TRI Data by Industry

On- and Off-site Releases

Metal mines reported the largest total releases of mercury and mercury compounds in 2001, with 4.32 million pounds or 88.1 percent of the total on- and off-site releases (see Table 3-46). Metal mines reported the largest other on-site land releases (that is, land releases other than RCRA subtitle C landfills), with 4.30 million pounds or 96.5 percent of all such releases. The hazardous waste/solvent recovery industries reported the second largest total releases. Their 164,837 pounds of releases account-

Map 3-3: Total On- and Off-site Releases, 2001: Mercury and Mercury Compounds



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Table 3-44: TRI On-site and Off-site Releases, by State, 2001: Mercury and Mercury Compounds

State	Total Forms	On-site Releases							Off-site Releases	Total On- and Off-site Releases
				Underground Injection		On-site Land Releases				
		Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	
	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	48	5,903.26	52.69	0.00	12.00	16,400.00	84,924.18	107,292.13	387.79	107,679.92
Alaska	9	234.24	0.12	0.00	7,867.00	0.00	9,670.00	17,771.36	5.60	17,776.96
Arizona	20	1,573.42	0.00	0.00	0.00	0.00	29,029.96	30,603.39	428.55	31,031.93
Arkansas	19	1,632.15	7.47	0.00	0.00	0.00	88.84	1,728.46	340.66	2,069.12
California	100	5,667.94	10.10	0.00	0.61	14,250.80	34,753.92	54,683.36	36,664.30	91,347.66
Colorado	28	820.50	1.87	0.00	0.00	199.70	1,710.62	2,732.69	683.70	3,416.39
Connecticut	12	122.88	0.41	0.00	0.00	0.00	0.00	123.29	19,419.88	19,543.17
Delaware	9	1,482.01	20.30	0.00	0.00	0.00	215.30	1,717.61	48.97	1,766.58
Florida	53	2,538.38	12.23	0.00	0.00	431.00	2,218.19	5,199.80	280.17	5,479.97
Georgia	32	3,692.51	14.43	0.00	0.00	0.00	911.41	4,618.34	98.02	4,716.36
Hawaii	6	114.37	3.60	0.00	2.30	0.00	0.00	120.27	28.90	149.17
Idaho	6	643.74	0.00	0.00	0.00	430.00	3,815.79	4,889.53	0.00	4,889.53
Illinois	68	5,974.22	15.97	0.00	0.00	263.00	1,605.52	7,858.71	58,151.16	66,009.86
Indiana	64	7,167.75	126.25	0.40	0.00	0.00	3,000.40	10,294.80	1,193.70	11,488.50
Iowa	45	2,712.97	6.13	0.00	0.00	0.00	125.61	2,844.71	479.83	3,324.54
Kansas	23	2,117.44	0.70	0.00	0.00	0.00	298.50	2,416.64	256.17	2,672.81
Kentucky	48	5,255.87	92.02	0.00	0.00	0.00	3,857.20	9,205.09	24,260.30	33,465.40
Louisiana	48	4,467.19	85.77	1.41	0.00	800.00	1,981.18	7,335.56	4,502.21	11,837.76
Maine	6	92.50	1.28	0.00	0.00	0.00	0.00	93.78	23.50	117.28
Maryland	21	2,221.64	2.72	0.00	134.03	0.00	443.02	2,801.41	707.70	3,509.11
Massachusetts	19	236.23	0.00	0.00	0.00	0.00	4.20	240.43	275.28	515.70
Michigan	52	3,995.64	21.81	0.00	0.00	13,491.00	1,077.74	18,586.19	7,236.62	25,822.82
Minnesota	29	1,835.32	1.64	0.00	0.00	0.00	962.96	2,799.92	391.77	3,191.69
Mississippi	19	632.80	135.26	1,052.90	0.00	115.00	5,284.44	7,220.40	219.31	7,439.71
Missouri	36	3,572.45	3.15	0.00	0.00	2.93	701.75	4,280.28	3,079.42	7,359.69
Montana	16	1,842.20	2.44	0.00	18.00	0.00	7,590.30	9,452.94	380.21	9,833.15
Nebraska	13	551.68	0.01	0.00	0.00	0.00	949.00	1,500.69	350.91	1,851.59
Nevada	30	12,959.27	1.00	0.00	0.10	2,545.00	4,177,021.90	4,192,527.27	1,215.76	4,193,743.03
New Hampshire	6	29.00	0.00	0.00	0.00	0.00	5.70	34.70	53.81	88.51
New Jersey	26	758.47	12.60	0.00	1.00	37.00	0.50	809.57	740.10	1,549.67
New Mexico	10	1,554.04	0.00	0.00	0.00	0.00	12,507.06	14,061.10	361.85	14,422.95
New York	38	1,358.05	17.05	0.00	0.00	0.00	566.45	1,941.55	1,080.39	3,021.94
North Carolina	38	4,163.58	18.89	0.00	0.00	0.00	2,137.85	6,320.33	496.32	6,816.65
North Dakota	10	2,306.12	0.40	0.00	0.00	0.00	278.00	2,584.52	354.72	2,939.24
Ohio	98	11,404.56	567.38	150.00	0.00	59.48	4,283.40	16,464.82	3,601.83	20,066.65
Oklahoma	20	1,513.99	8.91	0.00	0.00	3,360.00	171.11	5,054.01	629.61	5,683.62
Oregon	18	486.99	3.51	0.00	0.00	3,957.23	77.98	4,525.70	24.06	4,549.76
Pennsylvania	114	9,088.94	67.30	0.00	0.00	0.30	5,554.69	14,711.23	17,562.43	32,273.67
Puerto Rico	14	418.04	22.80	0.00	0.00	0.00	0.00	440.84	1.80	442.64
Rhode Island	6	0.10	0.00	0.00	0.00	0.00	0.00	0.10	3.35	3.45
South Carolina	37	2,262.54	99.17	0.00	0.00	0.00	1,411.87	3,773.57	1,536.68	5,310.26
South Dakota	6	229.42	0.02	0.00	0.00	0.00	46.60	276.04	0.00	276.04
Tennessee	39	4,061.83	108.97	0.00	0.00	993.00	1,779.73	6,943.53	17,819.24	24,762.77
Texas	113	14,765.36	50.57	536.40	0.00	71.10	6,185.42	21,608.85	3,482.73	25,091.58
Utah	21	1,002.02	5.00	0.00	0.00	2,584.00	41,603.46	45,194.48	790.92	45,985.40
Vermont	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Virgin Islands	3	176.00	0.00	0.00	0.00	0.00	50.00	226.00	138.00	364.00
Virginia	43	2,917.56	22.10	0.00	0.00	0.00	707.70	3,647.36	1,236.91	4,884.27
Washington	24	519.72	10.08	0.00	0.00	0.00	359.06	888.86	382.08	1,270.94
West Virginia	37	6,281.59	165.01	0.00	0.00	5.00	5,177.13	11,628.73	15,765.36	27,394.09
Wisconsin	45	3,403.11	5.92	0.00	0.00	13.30	211.99	3,634.32	1,048.55	4,682.87
Wyoming	19	1,701.25	0.10	0.00	0.00	0.00	623.15	2,324.50	61.82	2,386.32
Total	**1,665**	**150,462.84**	**1,805.15**	**1,741.11**	**8,035.04**	**60,008.84**	**4,455,980.78**	**4,678,033.75**	**228,282.95**	**4,906,316.70**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Table 3-45: Quantities of TRI Chemicals in Waste, by State, 2001: Mercury and Mercury Compounds

State	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
Alabama	16,321.97	55.50	0.00	0.00	16.00	2.10	108,152.12	124,547.69	0.00
Alaska	3.10	0.00	0.00	0.00	0.00	0.00	18,248.57	18,251.67	1.00
Arizona	5,474.00	1,244.45	0.00	0.00	0.00	0.00	31,114.56	37,833.00	0.90
Arkansas	0.75	6,180.65	0.00	0.00	0.00	10.00	2,418.96	8,610.36	0.04
California	185.55	5,366.23	0.00	0.00	12.70	33,248.00	60,570.33	99,382.81	26.41
Colorado	5.20	39.00	0.00	0.00	0.00	0.00	3,487.71	3,531.91	0.00
Connecticut	0.50	21,644.08	0.00	0.00	0.00	0.00	20,013.80	41,658.38	1.93
Delaware	7,800.00	3,536.22	0.00	0.00	0.00	0.00	2,722.10	14,058.32	118.00
Florida	0.00	735.50	0.00	0.00	0.00	0.00	4,912.86	5,648.37	9.00
Georgia	6.60	1,975.29	0.00	0.00	0.00	7.89	4,726.93	6,716.71	0.00
Hawaii	0.00	0.00	0.00	0.00	0.00	0.00	190.70	190.70	0.00
Idaho	0.00	0.00	0.00	0.00	0.00	0.00	4,864.00	4,864.00	25.42
Illinois	30.22	13,301.88	0.00	0.00	0.00	0.00	69,269.76	82,601.86	0.98
Indiana	4,586.00	2,429.65	0.00	0.00	0.00	3.00	11,691.99	18,710.64	0.00
Iowa	0.00	160.03	0.00	0.00	11.00	11.00	3,343.81	3,525.84	0.00
Kansas	0.00	290.90	0.00	0.00	0.00	0.00	2,860.38	3,151.28	13.00
Kentucky	14,700.00	6,958.00	0.00	0.00	0.00	98.90	34,255.83	56,012.73	0.00
Louisiana	47,730.66	3,997.29	0.00	0.00	641.87	0.00	13,186.42	65,556.24	0.00
Maine	0.00	17.20	0.00	0.00	0.20	0.00	123.10	140.50	0.00
Maryland	1.58	32.90	0.00	0.00	0.00	2.70	3,385.31	3,422.49	0.00
Massachusetts	0.00	487.00	0.00	0.00	0.00	23.40	536.81	1,047.21	0.00
Michigan	118.00	8,231.56	0.00	0.00	0.00	108.00	25,572.50	34,030.06	61.00
Minnesota	9.42	663.74	0.00	0.00	0.00	0.00	3,154.02	3,827.18	40.00
Mississippi	48.80	212.21	0.00	0.00	0.00	0.00	7,509.39	7,770.40	0.00
Missouri	108.00	413.06	0.00	0.00	0.00	0.00	7,159.12	7,680.18	227.20
Montana	27,529.00	29.09	0.00	0.00	0.00	11.41	3,451.17	31,020.67	6,424.00
Nebraska	0.00	26.00	0.00	0.00	0.00	255.00	1,640.44	1,921.44	0.00
Nevada	275,782.40	1,469.31	0.00	0.00	0.00	1,202.50	4,192,488.88	4,470,943.09	0.00
New Hampshire	0.00	39.00	0.00	0.00	0.00	13.63	88.80	141.43	0.01
New Jersey	0.00	7,363.93	0.00	1.80	0.00	114.30	1,534.63	9,014.66	1,716.60
New Mexico	0.00	4.70	0.00	0.00	0.00	1.84	14,944.81	14,951.35	363.00
New York	0.00	321.20	0.00	0.00	0.00	0.00	2,868.45	3,189.65	69.00
North Carolina	0.00	137.80	0.00	0.00	0.00	62.84	6,862.27	7,062.91	4.20
North Dakota	0.00	0.00	0.00	0.00	0.00	0.00	2,939.50	2,939.50	0.00
Ohio	9,548.00	11,245.75	0.00	0.00	0.00	0.50	21,444.07	42,238.32	91.00
Oklahoma	0.00	6.00	0.00	0.00	0.00	11.34	5,643.56	5,660.90	0.00
Oregon	9.65	65.00	0.00	0.00	0.00	0.00	4,682.70	4,757.35	0.00
Pennsylvania	139,012.00	9,075.08	0.00	0.00	0.00	44.44	32,358.54	180,490.06	20.24
Puerto Rico	0.00	1,392.26	0.00	0.00	0.00	0.00	442.64	1,834.90	0.00
Rhode Island	0.00	0.00	0.00	0.00	0.00	0.00	3.45	3.45	0.00
South Carolina	613.51	195.80	0.00	0.00	0.00	0.00	5,546.82	6,356.13	0.00
South Dakota	0.00	5.00	0.00	0.00	0.00	0.00	278.30	283.30	0.00
Tennessee	20,085.00	262.10	0.00	0.00	0.00	93.00	24,021.94	44,462.04	0.00
Texas	16,604.57	6,476.36	77.00	0.00	9,413.01	2,338.31	24,334.12	59,243.36	1,093.97
Utah	2.60	0.00	0.00	0.00	767.18	0.00	40,292.33	41,062.12	5,700.40
Vermont	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	3,500.00	0.00
Virgin Islands	0.00	0.00	0.00	0.00	0.00	0.00	366.00	366.00	0.00
Virginia	0.00	219.51	0.00	0.00	0.00	0.00	5,455.80	5,675.31	1.86
Washington	0.00	19,476.60	0.00	0.00	0.00	0.00	1,448.70	20,925.30	5.00
West Virginia	105,510.00	575.91	0.00	0.00	1.00	39.00	29,486.75	135,612.66	0.00
Wisconsin	43,269.75	21,668.60	0.00	0.00	0.00	93.70	4,679.46	69,711.51	0.00
Wyoming	0.00	15.00	0.00	0.00	0.01	0.00	2,384.42	2,399.43	0.00
Total	**735,096.83**	**161,542.34**	**77.00**	**1.80**	**10,862.96**	**37,796.80**	**4,873,159.63**	**5,818,537.36**	**16,014.15**

Note: Data are from Section 8 of Form R.

Table 3-46: TRI On-site and Off-site Releases, by Industry, 2001: Mercury and Mercury Compounds

SIC Code	Industry	Total Forms	On-site Releases							Off-site Releases	Total On- and Off-site Releases
					Underground Injection		On-site Land Releases				
		Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
10	Metal Mining	56	12,938.05	7.52	0.00	7,885.10	0.00	4,298,872.87	4,319,703.55	1,463.50	4,321,167.05
12	Coal Mining	54	7.83	175.73	0.00	146.03	0.00	6,284.35	6,613.94	56.70	6,670.64
20	Food	26	393.51	0.00	0.00	0.00	0.00	45.65	439.16	141.23	580.39
21	Tobacco	4	147.30	2.00	0.00	0.00	0.00	0.00	149.30	130.50	279.80
22	Textiles	1	15.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	15.00
24	Lumber	3	4.23	0.00	0.00	0.00	0.00	0.00	4.23	0.00	4.23
26	Paper	104	2,277.44	574.91	0.00	0.00	4.48	873.07	3,729.91	340.28	4,070.19
27	Printing	1	0.05	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05
28	Chemicals	185	16,555.21	348.42	1,056.71	1.00	1,131.00	13,330.56	32,422.90	44,739.03	77,161.93
29	Petroleum	118	1,965.14	97.64	76.00	2.71	0.00	148.34	2,289.83	1,453.11	3,742.94
30	Plastics	10	15.84	0.00	0.00	0.00	0.00	0.00	15.84	48.67	64.51
32	Stone/Clay/Glass	181	12,848.08	3.16	0.00	0.00	0.00	84,851.87	97,703.11	146.31	97,849.43
33	Primary Metals	140	8,639.61	127.24	0.40	0.00	53.40	14,260.49	23,081.14	15,092.42	38,173.56
34	Fabricated Metals	7	12.75	0.00	0.00	0.00	0.00	0.00	12.75	70.00	82.75
35	Machinery	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00
36	Electrical Equip.	40	369.51	0.53	0.00	0.00	0.00	0.52	370.56	4,781.84	5,152.39
37	Transportation Equip.	10	25.10	0.00	0.00	0.00	0.00	0.00	25.10	16.80	41.90
38	Measure/Photo.	13	109.10	4.00	0.00	0.00	2.93	0.05	116.07	27.20	143.27
39	Miscellaneous	6	0.06	0.00	0.00	0.00	0.00	16.00	16.06	63.93	79.99
--	Multiple codes 20-39	51	1,453.05	38.52	0.00	0.00	0.30	261.75	1,753.62	1,631.03	3,384.65
--	No codes 20-39	13	370.25	0.12	0.00	0.00	0.00	2.70	373.07	33,850.58	34,223.65
491/493	Electric Utilities	506	91,143.54	418.21	0.00	0.20	547.00	36,918.92	129,027.88	19,366.39	148,394.27
5169	Chemical Wholesale Distributors	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	95.55	95.55
5171	Petroleum Terminals/Bulk Storage	67	0.89	0.10	0.00	0.00	0.00	0.00	0.99	0.11	1.10
7389/4953	Hazardous Waste/Solvent Recovery	62	1,171.30	7.04	608.00	0.00	58,269.73	113.64	60,169.71	104,667.77	164,837.47
	Total	**1,665**	**150,462.84**	**1,805.15**	**1,741.11**	**8,035.04**	**60,008.84**	**4,455,980.78**	**4,678,033.75**	**228,282.95**	**4,906,316.70**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

ed for 3.4 percent of total releases of mercury and mercury compounds in 2001. The hazardous waste/solvent recovery industries also reported the largest off-site releases (transfers to disposal) of mercury and mercury compounds, with 104,668 pounds or 45.9 percent of all off-site releases.

Electric utilities reported the third largest total releases, with 148,394 pounds or 3.0 percent of the total releases of mercury and mercury compounds in 2001. They reported the largest air emissions of any industry sector, with 91,144 pounds or 60.6 percent of all air emissions of mercury and mercury compounds.

Waste Management

The metal mining industry reported the largest amount of mercury and mercury compounds in production-related waste in 2001 (see Table 3-47). With 4.6 million pounds of mercury and mercury compounds in production-related waste, it accounted for 79.0 percent of the total. Over 93.9 percent (4.3 million pounds) of mercury and mercury compounds in production-related waste reported by the metal mining industry was released on- and off-site. The metal mining industry also reported the largest amount recycled on-site (275,971 pounds, or 37.5 percent of the total amount recycled on-site).

The chemical industry reported the second largest amount of mercury and mercury compounds in production-related waste, with 357,537 pounds or 6.1 percent of the total for mercury and mercury compounds in 2001. Almost 70.9 percent of the mercury and mercury compounds in production-related waste reported by the chemical industry (253,431 pounds) was recycled on-site.

Projected Quantities of TRI Chemicals Managed in Waste, 2001-2003

TRI facilities expected to decrease their production-related waste of mercury and mercury compounds between 2001 and 2003 by 5.4 percent, from 5.8

Table 3-47: Quantities of TRI Chemicals in Waste, by Industry, 2001: Mercury and Mercury Compounds

SIC Code	Industry	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
10	Metal Mining	275,970.60	1,470.61	0.00	0.00	0.00	1,200.00	4,320,214.42	4,598,855.63	0.90
12	Coal Mining	0.00	0.00	0.00	0.00	1.00	0.00	6,594.33	6,595.33	363.00
20	Food	0.00	0.00	0.00	0.00	0.00	28.00	571.40	599.40	0.00
21	Tobacco	0.00	0.00	0.00	0.00	0.00	0.00	279.80	279.80	0.00
22	Textiles	0.00	0.00	0.00	0.00	0.00	0.00	176.00	176.00	0.00
24	Lumber	0.00	0.01	0.00	0.00	0.00	0.00	4.23	4.24	0.00
26	Paper	0.11	337.11	0.00	0.00	45.20	8.96	3,951.29	4,342.67	1.20
27	Printing	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00
28	Chemicals	253,431.01	20,430.85	0.00	0.00	632.58	2,484.30	80,558.27	357,537.01	1,310.14
29	Petroleum	26.04	2,101.82	0.00	1.80	9,404.01	73.69	5,091.97	16,699.32	14.27
30	Plastics	0.50	0.00	0.00	0.00	0.00	0.00	65.10	65.60	0.10
32	Stone/Clay/Glass	3,657.74	228.93	77.00	0.00	0.00	0.00	97,718.13	101,681.80	124.38
33	Primary Metals	67,764.46	12,640.05	0.00	0.00	0.00	98.04	26,441.22	106,943.76	12,183.10
34	Fabricated Metals	0.00	59.00	0.00	0.00	0.00	65.00	17.75	141.75	0.00
35	Machinery	0.00	160.00	0.00	0.00	0.00	0.00	100.00	260.00	0.00
36	Electrical Equip.	0.00	14,459.69	0.00	0.00	0.00	2.79	5,560.94	20,023.42	1,645.02
37	Transportation Equip.	0.00	516.50	0.00	0.00	0.00	3.90	35.90	556.30	6.20
38	Measure/Photo.	0.00	10,313.15	0.00	0.00	0.00	19.50	139.12	10,471.77	0.00
39	Miscellaneous	0.00	21.00	0.00	0.00	0.00	0.00	63.99	84.99	0.00
--	Multiple codes 20-39	120,000.00	1,150.56	0.00	0.00	0.00	24.97	4,059.27	125,234.80	61.00
--	No codes 20-39	0.00	0.00	0.00	0.00	0.00	33,302.75	1,111.83	34,414.58	0.00
491/493	Electric Utilities	226.00	4,446.19	0.00	0.00	0.00	0.00	149,323.31	153,995.51	304.71
5169	Chemical Wholesale Distributors	0.00	32.80	0.00	0.00	0.00	0.00	133.00	165.80	0.00
5171	Petroleum Terminals/Bulk Storage	0.00	94.19	0.00	0.00	0.00	0.00	1.29	95.48	0.11
7389/4953	Hazardous Waste/Solvent Recovery	14,020.37	93,079.88	0.00	0.00	780.18	484.90	170,947.03	279,312.36	0.04
	Total	**735,096.83**	**161,542.34**	**77.00**	**1.80**	**10,862.96**	**37,796.80**	**4,873,159.63**	**5,818,537.36**	**16,014.15**

Note: Data are from Section 8 of Form R.

million pounds to 5.5 million pounds (see Table 3-48). The decrease was projected to occur within most types of waste management. The quantity released on- and off-site, the largest type of waste management activity, was expected to decline by 3.8 percent. On- and off-site releases are the least-desirable outcome under the waste management hierarchy described in **Waste Management** in Chapter 1 (Figure 1-2).

From 2001 to 2002, a decrease of 5.4 percent was projected, with no change projected from 2002 to 2003. The actual change from the prior year of 2000

Table 3-48: Prior Year, Current Year and Projected Quantities of TRI Chemicals in Waste, 2000-2003: Mercury and Mercury Compounds

Waste Management Activity	Prior Year 2000		Current Year 2001		Projected 2002		Projected 2003	
	Total Pounds	Percent of Total	Total Pounds	Percent of Total	Total Pounds	Percent of Total	Total Pounds	Percent of Total
Recycled On-site	598,106.06	12.8	735,096.83	12.6	659,130.82	12.0	667,523.62	12.1
Recycled Off-site	125,891.13	2.7	161,542.34	2.8	139,373.36	2.5	136,081.52	2.5
Energy Recovery On-site	56.00	0.0	77.00	0.0	77.00	0.0	77.00	0.0
Energy Recovery Off-site	24.91	0.0	1.80	0.0	10.00	0.0	10.00	0.0
Treated On-site	23,647.86	0.5	10,862.96	0.2	10,255.41	0.2	10,253.41	0.2
Treated Off-site	1,026.20	0.0	37,796.80	0.6	2,014.23	0.0	2,014.73	0.0
Quantity Released On- and Off-site	3,927,400.01	84.0	4,873,159.63	83.8	4,695,069.12	85.3	4,690,287.62	85.2
Total Production-related Waste Managed	**4,676,152.17**	**100.0**	**5,818,537.36**	**100.0**	**5,505,929.94**	**100.0**	**5,506,247.90**	**100.0**

Waste Management Activity	Change 2000-2001 Percent	Projected Change 2001-2002 Percent	Projected Change 2002-2003 Percent	Projected Change 2001-2003 Percent
Recycled On-site	22.9	-10.3	1.3	-9.2
Recycled Off-site	28.3	-13.7	-2.4	-15.8
Energy Recovery On-site	37.5	0.0	0.0	0.0
Energy Recovery Off-site	-92.8	455.6	0.0	455.6
Treated On-site	-54.1	-5.6	0.0	-5.6
Treated Off-site	3,583.2	-94.7	0.0	-94.7
Quantity Released On- and Off-site	24.1	-3.7	-0.1	-3.8
Total Production-related Waste Managed	**24.4**	**-5.4**	**0.0**	**-5.4**

Note: Data from Section 8 of Form R for 2001.

Table 3-49: Number of Forms Reporting Source Reduction Activity, by Category, 2001: Mercury and Mercury Compounds

CAS Number	Chemical	Total Form Rs	Forms Reporting Source Reduction Activity		Category of Source Reduction Activity							
				Percent of All Form Rs	Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Materials Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
		Number	Number	Percent	Number	Number	Number	Number	Number	Number	Number	Number
7439-97-6	Mercury	537	65	12.1	16	1	17	5	24	0	0	2
--	Mercury compounds	1,128	77	6.8	30	10	8	8	20	0	0	1
	Total	**1,665**	**142**	**8.5**	**46**	**11**	**25**	**13**	**44**	**0**	**0**	**3**

Note: All source reduction activities on a form are counted in the corresponding category. Totals do not equal the sum of the categories because forms may report more than one source reduction activity.

to 2001 was an increase of 24.4 percent, from 4.7 million pounds to 5.8 million pounds.

Source Reduction

In 2001, 142 forms were filed reporting source reduction activities for mercury and mercury compounds (see Table 3-49). As noted in **Waste Management** in Chapter 1, source reduction—an activity that prevents the generation of waste—is preferred to waste management. These 142 forms represented 8.5 percent of all forms submitted for mercury and mercury compounds in 2001.

The most frequently reported source reduction activity was good operating practices (listed on 46 forms). Process modifications came next, with 44 forms, followed by spill and leak prevention, with 25 forms.

On- and Off-site Releases, 2000-2001

On- and off-site releases of mercury and mercury compounds increased from 4.3 million pounds to 4.9 million pounds from 2000 to 2001, an increase of 13.7 percent (see Table 3-50). On-site releases increased by 35.2 percent, or 1.2 million pounds. This was due to an increase in other on-site landfills releases (that is, other than RCRA subtitle C landfills), which increased by 1.3 million pounds or 39.1 percent. All other types of on-site releases of mercury and mercury compounds decreased from 2000 to 2001. On-site releases to RCRA subtitle C landfills decreased by 21,998 pounds or 26.8 percent. On-site air releases decreased by 11,180 pounds or 6.9 percent, surface water discharges decreased by 622 pounds or 25.6 percent and underground injection decreased by 1,937 pounds or 16.5 percent.

Off-site releases (transfers to disposal) of mercury and mercury compounds also decreased from 2000 to 2001, by 73.3 percent, or 626,185 pounds. This was primarily due to decreases in mercury and mercury compounds being sent for solidification/stabilization and sent to landfills/surface impoundments. Transfers for solidification/stabilization decreased by 347,076 pounds or 83.6 percent. Transfers to landfills/surface impoundments decreased by 285,043 pounds or 74.9 percent.

Waste Management Data, 2000-2001

Quantities of TRI Chemicals in Waste, 2000-2001

Mercury and mercury compounds in production-related waste increased from 4.9 million pounds in 2000 to 5.8 million pounds in 2001, an increase of 17.7 percent (see Table 3-51). The quantity released on- and off-site increased by 833,228 pounds or 20.6 percent. The amount treated off-site increased by 34,181 pounds and the amount recycled on-site increased by 25,290 pounds.

Decreases were reported in the amount of mercury and mercury compounds in production-related waste treated on-site, a decrease of 13,098 pounds or 54.7 percent. The amount of mercury and mercury compounds in waste recycled off-site also decreased, by 6,139 pounds or 3.7 percent.

Table 3-50: TRI On-site and Off-site Releases, 2000-2001: Mercury and Mercury Compound

	2000 Number	2001 Number	Change 2000-2001 Number	Change 2000-2001 Percent
Forms	1,627	1,665	38	2.3
On-site Releases	**Pounds**	**Pounds**	**Pounds**	**Percent**
Total Air Emissions	161,643.04	150,462.84	-11,180.20	-6.9
Surface Water Discharges	2,427.37	1,805.15	-622.22	-25.6
Underground Injection	11,713.52	9,776.15	-1,937.37	-16.5
Class I Wells	1,931.72	1,741.11	-190.61	-9.9
Class II-V Wells	9,781.80	8,035.04	-1,746.76	-17.9
On-site Land Releases	3,285,051.41	4,515,989.61	1,230,938.20	37.5
RCRA Subtitle C Landfills	82,007.27	60,008.84	-21,998.44	-26.8
Other On-site Land Releases	3,203,044.14	4,455,980.78	1,252,936.63	39.1
Total On-site Releases	**3,460,835.34**	**4,678,033.75**	**1,217,198.42**	**35.2**
Off-site Releases				
Storage Only*	10,196.55	7,447.94	-2,748.61	-27.0
Solidification/Stabilization**	415,330.48	68,254.65	-347,075.83	-83.6
Metals and Metal Category Compounds Only				
Wastewater Treatment (Excluding POTWs)***	6,850.32	2,679.38	-4,170.94	-60.9
Metals and Metal Category Compounds Only				
Transfers to POTWs****	413.09	469.60	56.51	13.7
Metals and Metal Category Compounds Only				
Underground Injection	0.00	118.13	118.13	--
Landfills/Surface Impoundments	380,563.81	95,521.11	-285,042.70	-74.9
Land Treatment	516.03	717.37	201.34	39.0
Other Land Disposal	1,966.63	2,061.28	94.65	4.8
Other Off-site Management	6,919.27	9,147.05	2,227.77	32.2
Transfers to Waste Broker for Disposal	17,753.21	24,965.38	7,212.17	40.6
Unknown*****	13,958.38	16,901.06	2,942.68	21.1
Total Off-site Releases (Transfers Off-site to Disposal)	**854,467.77**	**228,282.95**	**-626,184.82**	**-73.3**
Total On- and Off-site Releases	**4,315,303.11**	**4,906,316.70**	**591,013.59**	**13.7**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

* Storage only (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to storage only are included as a form of disposal (off-site release). See Box 1-5.

** Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal cateogry compounds (waste treatment code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste treatment code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 1-6. Reports under code M40 of metals and metal category compounds have been included in solidification/stabilization of metals and metal cateogry compounds in this report.

*** Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal category compounds (waste treatment code M61) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste treatment code M60). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 1-6. Transfers of metals and metal category compounds reported under code M60 have been included in transfers of metals and metal category compounds to wastewater treatment.

**** Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal category compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

***** Unknown (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as unknown transfers are treated as a form of disposal (off-site release).

Table 3-51: Quantities of TRI Chemicals in Waste by Waste Management Activity, 2000-2001: Mercury and Mercury Compounds

Waste Management Activity	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Recycled On-site	709,807.11	735,096.83	25,289.72	3.6
Recycled Off-site	167,681.83	161,542.34	-6,139.48	-3.7
Energy Recovery On-site	77.73	77.00	-0.73	-0.9
Energy Recovery Off-site	71.01	1.80	-69.21	-97.5
Treated On-site	23,960.88	10,862.96	-13,097.92	-54.7
Treated Off-site	3,615.53	37,796.80	34,181.27	945.4
Quantity Released On- and Off-site	4,039,931.39	4,873,159.63	833,228.24	20.6
Total Production-related Waste Managed	**4,945,145.47**	**5,818,537.36**	**873,391.89**	**17.7**
Non-production-related Waste Managed	18,143.88	16,014.15	-2,129.72	-11.7

Note: Data are from Section 8 of Form R of year indicated.

Table 3-52: TRI Transfers Off-site for Further Waste Management, including Disposal, 2000-2001: Mercury and Mercury Compounds

	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Transfers to Recycling	166,536.05	160,904.56	-5,631.49	-3.4
Transfers to Energy Recovery	1.00	0.00	-1.00	-100.0
Transfers to Treatment	58.00	13.40	-44.60	-76.9
Transfers to POTWs	413.09	469.60	56.51	13.7
Metals and Metal Category Compounds Only	413.09	469.60	56.51	13.7
Non-metal TRI Chemicals	0.00	0.00	0.00	--
Other Off-site Transfers*	0.00	1,392.00	1,392.00	--
Other Off-site Transfers to Disposal**	897,709.71	246,408.57	-651,301.14	-72.6
Total Transfers for Further Waste Management, including Disposal	**1,064,717.85**	**409,188.12**	**-655,529.73**	**-61.6**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

Transfers Off-site for Further Waste Management, including Disposal, 2000-2001

As shown in Table 3-52, transfers off-site for further waste management, including disposal, of mercury and mercury compounds decreased from 2000 to 2001, by 655,530 pounds or 61.6 percent. Other off-site transfers to disposal decreased by 651,301 pounds or 72.6 percent. Mercury and mercury compounds in waste sent for recycling also decreased, by 5,631 pounds or 3.4 percent.

Other types of transfers showed increases. Transfers to POTWs of mercury and mercury compounds increased from 2000 to 2001, by 57 pounds or 13.7 percent.

Polycyclic Aromatic Compounds

INTRODUCTION

Polycyclic aromatic compounds (PACs), also known as polycyclic aromatic hydrocarbons (PAHs), are a group of over 100 different chemicals that are characterized by hydrogen and carbon arranged in two or more fused benzene rings. PACs originate from both natural and anthropogenic sources. As pure chemicals, PACs generally exist as colorless, white, or pale yellow-green solids. Most PACs do not occur alone in the environment; rather, they are found as a mixture of two or more PACs. High concentrations of PACs are present in substances such as fuel oil, coal, coal tar pitch, creosote, and road and roofing tar. The TRI PACs category consists of 21 specifically listed compounds as listed in Box 3-4.

Box 3-4: Polycyclic Aromatic Compounds Category

CAS Number	Chemical Name
56-55-3	Benzo(a)anthracene
205-99-2	Benzo(b)fluoranthene
205-82-3	Benzo(j)fluoranthene
207-08-9	Benzo(k)fluoranthene
206-44-0	Benzo(j,k)fluorine
189-55-9	Benzo(r,s,t)pentaphene
218-01-9	Benzo(a)phenanthrene
50-32-8	Benzo(a)pyrene
226-36-8	Dibenz(a,h)acridine
224-42-0	Dibenz(a,j)acridine
53-70-3	Dibenzo(a,h)anthracene
194-59-2	7H-dibenzo(c,g)carbazole
5385-75-1	Dibenzo(a,e)fluoranthene
192-65-4	Dibenzo(a,e)pyrene
189-64-4	Dibenzo(a,h)pyrene
191-30-0	Dibenzo(a,l)pyrene
57-97-6	7,12-dimethylbenz(a)anthracene
193-39-5	Indeno(1,2,3-cd)pyrene
56-49-5	3-Methylcholanthrene
3697-24-3	5-Methylchrysene
5522-43-0	1-Nitropyrene

For the purpose of this report, these chemicals are profiled as a group. Benzo(g,h,i)perylene is another PAC which is listed separately from the PAC category in TRI and is discussed separately in this section. Benzo(g,h,i)perylene is listed separately because unlike all the members of the PACs category which were added to TRI based on concerns for carcinogenicity, benzo(g,h,i)perylene was added based on concerns for ecotoxicity.

More details on the TRI PACs, their sources, chemical characteristics, health and environmental effects and efforts being undertaken to reduce pollution from PACs can be found in the *2000 Toxics Release Inventory Public Data Release Report* (EPA 260-R-02-003).

2001 TRI DATA FOR POLYCYCLIC AROMATIC COMPOUNDS

On-site and Off-site Releases, 2001

As shown in Table 3-53, there were 3,813 TRI forms submitted for polycyclic aromatic compounds for 2001. On- and off-site releases for polycyclic aromatic compounds totaled 3.0 million pounds, with 2.9 million pounds of this reported as the chemical category of polycyclic aromatic compounds.

Off-site releases (transfers to disposal) were the largest type of release for both the chemical category polycyclic aromatic compounds and the chemical benzo(g,h,i)perylene. Off-site releases accounted for 54.3 percent of total releases or 1.6 million pounds (see Figure 3-10). The second largest release type was air emissions, which accounted for 39.4 percent or 1.2 million pounds. The next largest types of releases were on-site land releases to RCRA subtitle C landfills of 97,094 pounds, accounting for 3.3 percent, and other on-site land releases of 71,293 pounds or 2.4 percent. (Types of on-site land releases are described in Box 1-4 in Chapter 1.)

Table 3-53: TRI On-site and Off-site Releases, 2001: Polycyclic Aromatic Compounds

			On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
CAS Number	Chemical	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
191-24-2	Benzo(g,h,i)perylene	1,509	31,455.26	685.17	1.00	1.65	3,716.71	4,852.90	40,712.69	86,240.63	126,953.32
--	Polycyclic aromatic compounds	2,304	1,146,126.02	16,384.58	1.10	331.30	93,377.34	66,439.62	1,322,659.96	1,536,544.27	2,859,204.23
	Total	**3,813**	**1,177,581.28**	**17,069.76**	**2.10**	**332.95**	**97,094.05**	**71,292.51**	**1,363,372.65**	**1,622,784.90**	**2,986,157.55**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Much smaller amounts of the other types of releases were reported for 2001. Surface water discharges were 17,070 pounds, and underground injection of polycyclic aromatic compounds was 335 pounds.

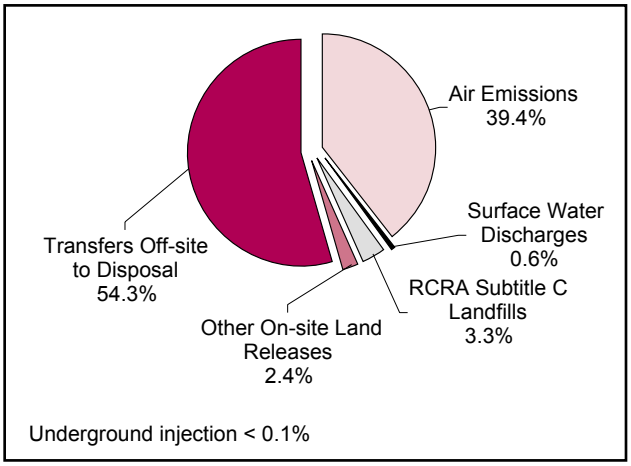
Waste Management Data, 2001

Quantities of TRI Chemicals in Waste

Polycyclic aromatic compounds in production-related waste totaled 25.0 million pounds in 2001, as shown in Table 3-54. Over 94.7 percent was reported as the chemical category polycyclic aromatic compounds.

A total of 10.4 million pounds (41.6 percent) of polycyclic aromatic compounds in production-related waste was burned for energy recovery on-site in 2001 (see Figure 3-11). Treatment on-site accounted for 32.7 percent or 8.2 million pounds and releases on- and off-site site accounted for 12.1 percent, or 3.0 million pounds. Recycling on-site was 2.2 million pounds or 8.7 percent, and the other types of waste management accounted for 4.9 percent of the total.

Figure 3-10: Distribution of TRI On-site and Off-site Releases, 2001: Polycyclic Aromatic Compounds



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Transfers Off-site for Further Waste Management, including Disposal

Transfers off-site for further waste management, including disposal, of polycyclic aromatic compounds totaled 2.9 million pounds in 2001 (see Table 3-55). Transfers of the chemical category polycyclic aromatic compounds accounted for 2.8 million pounds or 95.5 percent of the total.

More than half of the transfers for further waste management, including disposal, of polycyclic aromatic compounds were other transfers off-site to disposal (1.7 million pounds) (see Figure 3-12). Transfers to recycling accounted for 31.6 percent (917,122 pounds), transfers to energy recovery were 6.4 percent (186,015 pounds) and transfers to treatment were 4.1 percent (119,572 pounds). Other types of transfers were less than one percent of total transfers for further waste management, including disposal, of polycyclic aromatic compounds for 2001.

TRI Data by State

Facilities in Massachusetts, with 274 forms, submitted the largest number of forms in 2001 for polycyclic aromatic compounds. Three other states,

Table 3-54: Quantities of TRI Chemicals in Waste, 2001: Polycyclic Aromatic Compounds

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
191-24-2	Benzo(g,h,i)perylene	140,586.01	37,229.40	808,168.96	3,744.11	199,443.74	1,911.27	122,772.28	1,313,855.78	1,565.82
--	Polycyclic aromatic compounds	2,040,493.51	822,954.35	9,593,812.06	175,067.67	7,982,246.65	178,955.12	2,895,075.65	23,688,605.01	17,309.23
	Total	**2,181,079.52**	**860,183.75**	**10,401,981.02**	**178,811.78**	**8,181,690.39**	**180,866.39**	**3,017,847.94**	**25,002,460.79**	**18,875.05**

Note: Data are from Section 8 of Form R.

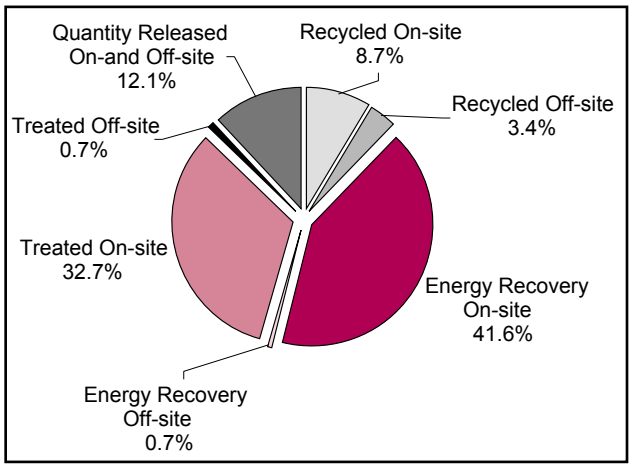
Texas, Pennsylvania, and New York, also had more than 200 forms, with 269, 217, and 213 forms respectively.

On- and Off-site Releases

In 2001, facilities in the state of Ohio reported the largest total on- and off-site releases of polycyclic aromatic compounds (see Table 3-56). They reported a total of 789,015 pounds, or one-quarter of the total releases of polycyclic aromatic compounds for 2001. The state of Washington accounted for 377,284 pounds of releases or 12.6 percent of the total, and the state of West Virginia was third with 341,762 pounds or 11.4 percent.

More than half (52.5 percent or 414,421 pounds) of Ohio's releases of polycyclic aromatic compounds were air emissions, with most of the rest of Ohio's releases being off-site releases (transfers off-site to disposal). Ohio facilities reported the largest amount of air emissions of any state, with 35.2 percent of total air emissions of polycyclic aromatic compounds.

Figure 3-11: Distribution of Quantities of TRI Chemicals in Waste, 2001: Polycyclic Aromatic Compounds



Note: Data are from Section 8 of Form R.

As shown in Map 3-4, releases of polycyclic aromatic compounds show some degree of geographic concentration. Five states, Ohio, Washington, West Virginia, Louisiana and South Carolina, each released more than 100,000 pounds, and another seven states each released more than 50,000 pounds of polycyclic aromatic compounds in 2001.

Waste Management Data

Tennessee had the largest quantity of polycyclic aromatic compounds in production-related waste of any state in 2001 (see Table 3-57). Tennessee facilities reported 4.2 million pounds of polycyclic aromatic compounds in total production-related waste and accounted for 16.8 percent of polycyclic aromatic compounds in production-related waste. Texas ranked second with 3.3 million pounds (13.1 percent of the total), and Louisiana was third with 2.7 million pounds (10.6 percent of the total).

A total of 3.4 million pounds of polycyclic aromatic compounds in production-related waste in Tennessee was burned for energy recovery on-site. This represented 81.6 percent of the total reported by Tennessee and accounted for 32.9 percent of all on-site energy recovery of polycyclic aromatic compounds in 2001.

For Texas, the largest component of polycyclic aromatic compounds in production-related waste was also on-site energy recovery, a total of 2.2 million pounds, representing 21.1 percent of the nation's total on-site energy recovery of these compounds and 66.7 percent of Texas' polycyclic aromatic compounds in production-related waste. Michigan reported the largest amount treated on-site, 1.9 mil-

Table 3-55: TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Polycyclic Aromatic Compounds

CAS Number	Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs: Metals and Metal Category Compounds Pounds	Transfers to POTWs: Non-metal TRI Chemicals Pounds	Other Off-site Transfers* Pounds	Other Off-site Transfers to Disposal** Pounds	Total Transfers for Further Waste Management, including Disposal Pounds
191-24-2	Benzo(g,h,i)perylene	37,468.68	3,754.58	1,755.55	0.00	328.62	0.00	86,393.81	129,701.24
--	Polycyclic aromatic compounds	879,653.57	182,260.28	117,815.97	0.00	6,048.97	105.82	1,585,032.64	2,770,917.24
	Total	**917,122.25**	**186,014.86**	**119,571.52**	**0.00**	**6,377.58**	**105.82**	**1,671,426.45**	**2,900,618.49**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

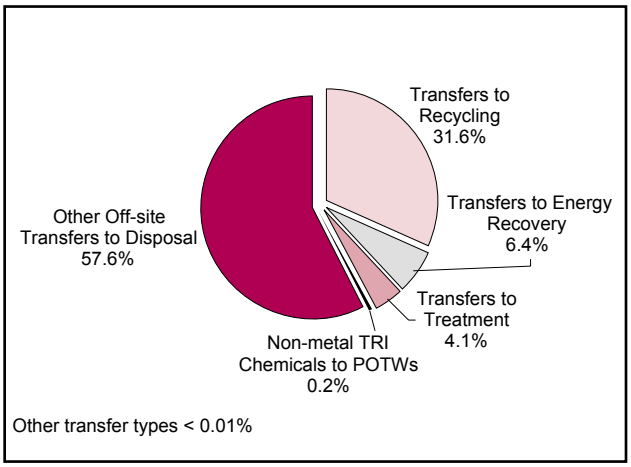
lion pounds, which was 23.4 percent of total on-site treatment of polycyclic aromatic compounds in 2001. Ohio reported the largest quantity released on- and off-site, with 797,973 pounds, accounting for 26.4 percent of all releases on- and off-site of polycyclic aromatic compounds in 2001.

TRI Data by Industry

On- and Off-site Releases

The primary metals industry reported the largest total releases of any industry sector, 1.2 million pounds or 38.7 percent of the total on- and off-site releases of polycyclic aromatic compounds in 2001 (see Table 3-58). The chemical manufacturing industry had the second largest total releases, with 504,964 pounds of total releases. Two other sectors, petroleum refining and plastics manufacturing, had over 200,000 pounds of releases of polycyclic aromatic compounds in 2001.

Figure 3-12: Distribution of TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Polycyclic Aromatic Compounds



Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.

A total of 624,009 pounds or 54.0 percent of the releases from the primary metals industry were off-site releases (transfers to disposal), and 528,212 pounds or 45.7 percent were air emissions. Off-site releases from the primary metals industry accounted for 38.5 percent of the total for all industries, and air emissions from the primary metals industry were 44.9 percent of total air emissions.

Over 85 percent of the chemical industry's total releases, the sector with the second largest releases, were off-site releases (transfers to disposal). The chemical industry reported 433,828 pounds of off-site releases. Petroleum refining, with the third largest releases (392,777 pounds) reported over half (232,776 pounds or 59.3 percent) as off-site releases (transfers to disposal).

Waste Management

The electrical equipment industry reported the largest amount of polycyclic aromatic compounds in production-related waste of polycyclic aromatic compounds in 2001 (see Table 3-59). With 5.3 million pounds of polycyclic aromatic compounds in production-related waste, this industry sector accounted for 21.3 percent of all production-related waste for these compounds.

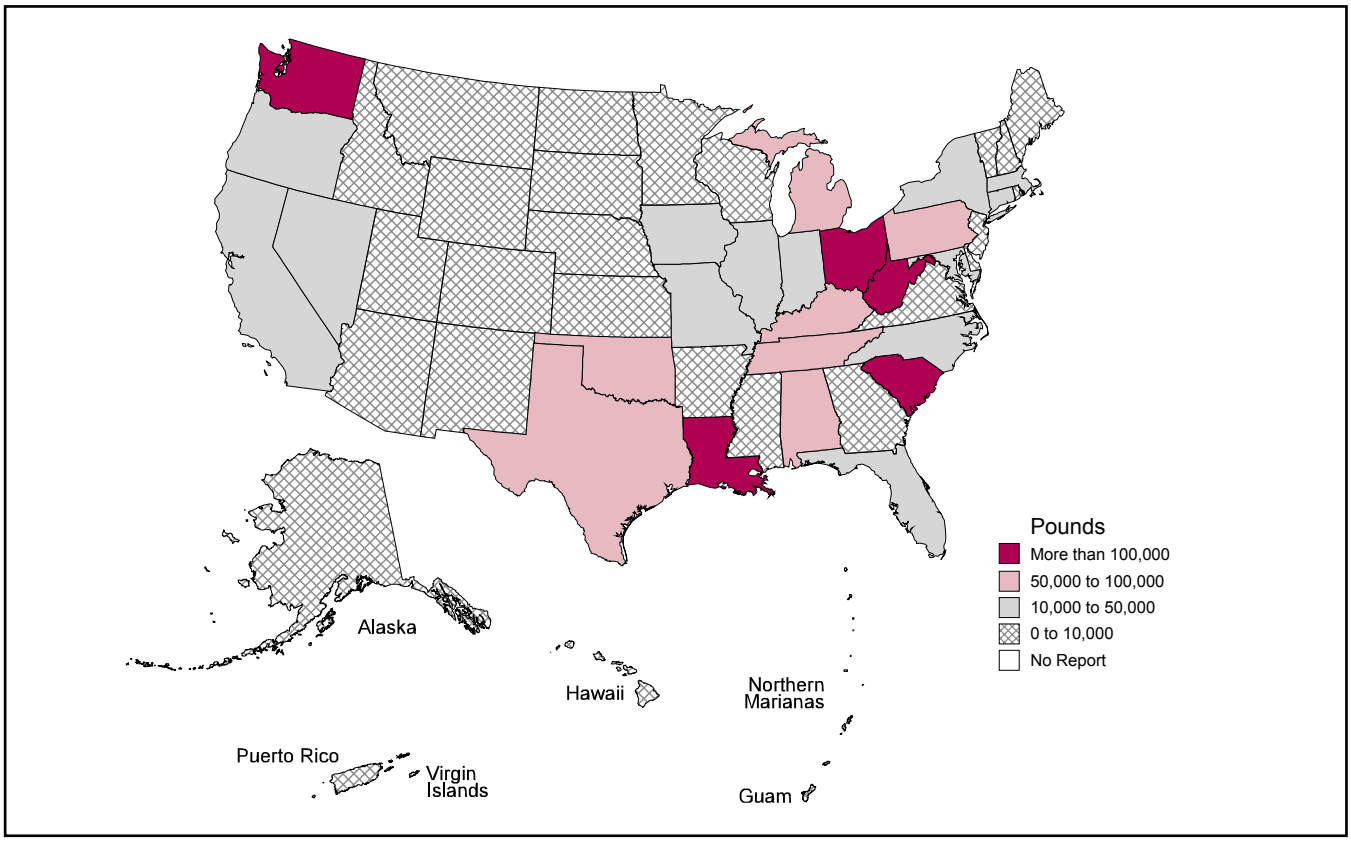
More than two-thirds (3.6 million pounds) of the polycyclic aromatic compounds in production-relat-

Table 3-56: TRI On-site and Off-site Releases, by State, 2001: Polycyclic Aromatic Compounds

State	Total Forms	On-site Releases							Off-site Releases	Total On- and Off-site Releases
				Underground Injection		On-site Land Releases				
		Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	
	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	91	16,842.75	400.94	0.00	0.00	9,022.00	5,642.08	31,907.77	62,941.24	94,849.01
Alaska	12	1,235.60	20.10	0.00	0.00	0.00	39.00	1,294.70	28.80	1,323.50
American Samoa	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arizona	38	1,215.69	0.00	0.00	0.00	0.00	423.40	1,639.09	0.40	1,639.49
Arkansas	35	5,077.63	189.10	0.00	0.00	0.00	711.81	5,978.54	621.53	6,600.07
California	167	1,519.86	360.94	0.00	0.00	31,061.04	3,406.95	36,348.78	144.81	36,493.59
Colorado	50	358.83	6.06	0.00	0.00	0.00	0.00	364.89	20.64	385.53
Connecticut	153	17,866.51	0.00	0.00	0.00	0.00	92.55	17,959.06	500.41	18,459.47
Delaware	23	122.05	4.00	0.00	0.00	0.00	0.00	126.05	0.00	126.05
District of Columbia	3	0.10	0.00	0.00	0.00	0.00	0.00	0.10	1.90	2.00
Florida	133	12,084.39	68.46	0.00	0.00	0.00	9,297.40	21,450.25	812.73	22,262.97
Georgia	100	3,392.30	146.13	0.00	0.00	0.00	370.02	3,908.45	2,498.69	6,407.14
Guam	10	772.65	0.00	0.00	0.00	3.00	4.70	780.35	0.00	780.35
Hawaii	32	1,220.16	253.00	0.00	0.00	0.00	0.42	1,473.58	3.00	1,476.58
Idaho	4	161.30	27.40	0.00	0.00	0.00	89.80	278.50	0.30	278.80
Illinois	75	17,385.77	58.10	0.00	0.00	2,112.00	147.59	19,703.46	24,833.71	44,537.17
Indiana	90	29,568.16	89.00	0.00	0.00	0.00	860.00	30,517.16	14,461.03	44,978.19
Iowa	40	24,623.26	0.00	0.00	0.00	0.00	0.00	24,623.26	5,614.00	30,237.26
Kansas	38	1,835.17	20.40	0.00	0.00	0.00	327.80	2,183.37	119.99	2,303.36
Kentucky	55	74,466.33	39.50	0.00	332.95	0.00	673.65	75,512.43	3,326.30	78,838.73
Louisiana	85	83,215.11	8,837.45	0.00	0.00	7,270.00	265.05	99,587.61	186,309.39	285,897.00
Maine	86	4,167.57	74.94	0.00	0.00	0.00	183.39	4,425.90	177.25	4,603.15
Maryland	66	21,523.32	0.00	0.00	0.00	0.00	403.00	21,926.32	7,624.57	29,550.89
Massachusetts	274	33,368.01	0.61	0.00	0.00	0.00	12.20	33,380.82	107.80	33,488.62
Michigan	83	38,238.94	46.53	0.00	0.00	15,962.00	614.38	54,861.85	12,226.35	67,088.21
Minnesota	67	4,248.88	0.00	0.00	0.00	0.00	52.65	4,301.53	742.06	5,043.59
Mississippi	30	2,481.66	140.20	0.00	0.00	0.00	278.21	2,900.07	2,564.30	5,464.37
Missouri	49	6,871.20	0.40	0.00	0.00	0.00	0.20	6,871.80	15,580.58	22,452.38
Montana	18	2,366.90	7.00	0.00	0.00	0.00	886.10	3,260.00	53.10	3,313.10
Nebraska	14	376.60	0.00	0.00	0.00	0.00	0.00	376.60	76.23	452.82
Nevada	9	1,022.11	0.00	0.00	0.00	0.00	2,669.00	3,691.11	8,203.30	11,894.41
New Hampshire	48	231.87	106.02	0.00	0.00	0.00	0.00	337.89	314.49	652.38
New Jersey	116	1,150.90	35.90	0.00	0.00	381.50	0.40	1,568.70	1,319.27	2,887.97
New Mexico	21	26.25	0.00	0.00	0.00	0.00	0.00	26.25	4.50	30.75
New York	213	22,211.50	25.02	0.00	0.00	0.00	13.90	22,250.43	10,522.50	32,772.93
North Carolina	140	31,560.52	108.80	0.00	0.00	0.00	140.30	31,809.62	8,295.19	40,104.81
North Dakota	14	242.94	0.00	0.00	0.00	0.00	29.48	272.42	6.45	278.87
Northern Marianas	6	0.69	0.00	0.00	0.00	0.00	0.30	0.99	0.00	0.99
Ohio	163	414,421.38	111.42	0.00	0.00	0.00	1,360.38	415,893.18	373,121.79	789,014.97
Oklahoma	35	2,461.48	21.20	0.00	0.00	0.00	176.99	2,659.67	87,321.59	89,981.26
Oregon	35	3,128.24	66.20	0.00	0.00	31,238.51	59.29	34,492.24	155.15	34,647.39
Pennsylvania	217	43,154.27	143.49	0.00	0.00	0.00	5,147.93	48,445.68	33,052.99	81,498.67
Puerto Rico	42	810.32	5.20	0.00	0.00	0.00	0.00	815.52	0.00	815.53
Rhode Island	45	990.75	5.09	0.00	0.00	0.00	0.00	995.85	72.83	1,068.68
South Carolina	119	96,369.12	70.96	0.00	0.00	0.00	251.94	96,692.02	60,488.76	157,180.78
South Dakota	9	8.15	0.90	0.00	0.00	0.00	0.00	9.05	492.50	501.55
Tennessee	77	29,675.65	190.42	0.00	0.00	0.00	35,080.45	64,946.52	1,423.25	66,369.77
Texas	269	59,748.35	4,855.29	2.10	0.00	44.00	1,046.26	65,695.99	17,584.37	83,280.37
Utah	23	5,016.18	73.50	0.00	0.00	0.00	10.00	5,099.68	4,031.52	9,131.20
Vermont	18	284.62	0.00	0.00	0.00	0.00	0.00	284.62	0.00	284.62
Virgin Islands	8	2,539.03	1.00	0.00	0.00	0.00	0.00	2,540.03	2.00	2,542.03
Virginia	93	9,140.35	48.94	0.00	0.00	0.00	7.50	9,196.79	180.61	9,377.40
Washington	69	22,812.13	292.00	0.00	0.00	0.00	464.37	23,568.50	353,715.93	377,284.43
West Virginia	34	22,260.96	72.38	0.00	0.00	0.00	0.00	22,333.34	319,428.59	341,761.93
Wisconsin	59	1,492.91	44.70	0.00	0.00	0.00	51.68	1,589.28	1,537.66	3,126.94
Wyoming	9	213.92	1.06	0.00	0.00	0.00	0.00	214.98	118.55	333.53
Total	**3,813**	**1,177,581.28**	**17,069.76**	**2.10**	**332.95**	**97,094.05**	**71,292.51**	**1,363,372.65**	**1,622,784.90**	**2,986,157.55**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Map 3-4: Total On- and Off-site Releases, 2001: Polycyclic Aromatic Compounds



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

ed waste reported by the electrical equipment industry was burned for energy recovery on-site. The electrical equipment industry reported 1.4 million pounds treated on-site (26.1 percent of the production-related waste of polycyclic aromatic compounds from the sector).

Electric utilities had the second largest amount of polycyclic aromatic compounds in production-related waste, with 4.9 million pounds or 19.7 percent of the total for polycyclic aromatic compounds in 2001. Almost two-thirds of it (3.3 million pounds) was treated on-site and one-third (1.6 million pounds) was burned for energy recovery on-site.

The chemical manufacturing industry reported the third largest amount of polycyclic aromatic compounds in production-related waste, with 4.6 million pounds or 18.5 percent of total polycyclic aromatic compounds in production-related waste in 2001. Most of this (3.2 million pounds) was burned for on-site energy recovery.

Projected Quantities of TRI Chemicals Managed in Waste, 2001-2003

TRI facilities expected to decrease their amount of polycyclic aromatic compounds in production-related waste between 2001 and 2002 by 9.7 percent, from 25.0 million pounds to 22.6 million pounds. An increase was projected from 2002 to 2003 of 4.8 percent, to 23.7 million pounds (see Table 3-60). The overall decrease projected from 2001 to 2003 was 5.3 percent.

The decrease from 2001 to 2002 was projected to occur primarily in the quantity burned for energy recovery on-site, which was projected to decrease

Table 3-57: Quantities of TRI Chemicals in Waste, by State, 2001: Polycyclic Aromatic Compounds

State	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
	On-site	Off-site	On-site	Off-site	On-site	Off-site			
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	12,290.30	6,821.40	0.00	848.80	30,963.11	4,075.10	84,990.24	139,988.95	143.41
Alaska	0.00	0.00	0.00	0.20	1,013.78	0.40	1,318.40	2,332.78	13.10
American Samoa	0.00	0.00	128.50	0.00	0.00	0.00	0.00	128.50	0.00
Arizona	0.00	0.00	106,979.90	0.00	539,677.08	167.10	1,639.47	648,463.55	0.00
Arkansas	466.00	4.40	2,312.00	8,037.20	735,476.05	13,355.80	5,827.25	765,478.70	222.50
California	73.00	1,858.97	1.00	0.20	2.20	1,898.25	36,909.57	40,743.19	383.10
Colorado	0.00	1,599.29	0.00	8.70	135,762.05	1,221.00	377.63	138,968.68	0.30
Connecticut	296.00	187.20	3,234.10	0.10	12,000.00	611.67	18,368.57	34,697.64	0.00
Delaware	0.00	0.00	210.00	0.00	400.00	0.00	126.13	736.13	0.00
District of Columbia	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
Florida	0.00	2,440.03	22,626.90	146.61	374.07	1,302.03	22,232.08	49,121.72	68.05
Georgia	0.00	1,260.88	20,714.00	1.00	70.00	94.60	6,508.02	28,648.50	0.00
Guam	0.00	0.00	0.00	0.00	0.00	3.00	763.35	766.35	17.00
Hawaii	0.00	0.08	0.00	0.00	0.00	15.01	1,491.19	1,506.28	1.41
Idaho	0.00	0.00	0.00	0.00	0.00	0.00	284.30	284.30	0.00
Illinois	4,858.10	12,587.69	0.00	58,345.00	18,320.30	2,852.62	40,059.88	137,023.59	6,881.38
Indiana	129,139.50	11,268.00	6,208.00	746.60	354,941.00	164.20	44,608.58	547,075.88	2,058.75
Iowa	75.37	6,602.80	6,773.00	738.70	0.00	128.00	30,145.25	44,463.12	0.00
Kansas	9.00	26.50	0.00	3.00	15.00	21.50	561.03	636.03	0.00
Kentucky	0.00	5,589.00	183,938.00	3.00	530,306.40	3,444.84	79,158.55	802,439.79	544.80
Louisiana	252,083.00	329,781.00	1,171,350.00	20,249.00	551,149.93	41,885.62	293,053.34	2,659,551.89	0.40
Maine	0.00	0.00	471,782.00	1,036.70	93.80	1,215.00	5,616.30	479,743.80	21.30
Maryland	332,511.20	2,040.35	611,450.20	0.00	12,483.20	1,463.97	29,921.51	989,870.43	0.00
Massachusetts	798.35	2,052.05	32,177.22	1,026.12	17,868.00	57.55	34,620.34	88,599.63	672.66
Michigan	37.00	4,319.40	3,073.80	151.70	1,918,326.80	94.05	66,802.61	1,992,805.36	3.64
Minnesota	5,250.70	5,949.53	103,081.00	1,019.04	198.06	118.96	5,043.40	120,660.70	202.76
Mississippi	829.07	1,764.00	144,097.80	3,410.40	15.20	45,160.10	8,674.95	203,951.52	581.90
Missouri	0.14	19,606.00	170.00	906.00	2,027.60	6,179.22	21,323.16	50,212.12	4.00
Montana	370.42	183.20	0.00	0.00	5.78	0.00	3,312.33	3,871.72	0.77
Nebraska	35.64	3,894.00	0.00	1.13	431.00	0.37	452.80	4,814.95	0.00
Nevada	0.00	0.00	993,336.00	6.90	0.00	0.00	11,849.60	1,005,192.50	6.01
New Hampshire	125.44	0.00	10,085.94	62.10	0.00	5.06	787.04	11,065.58	22.63
New Jersey	15.53	2,232.04	0.00	37.87	20,605.53	580.23	2,546.89	26,018.08	150.20
New Mexico	0.00	4,311.00	234,392.00	0.00	26,128.00	22.00	30.75	264,883.75	0.00
New York	76,346.60	3,581.24	3,874.30	115.02	156,461.90	2,479.57	32,794.29	275,652.92	0.00
North Carolina	25,643.00	7,052.10	1.65	183.91	224,547.80	538.82	40,390.56	298,357.85	0.00
North Dakota	0.00	0.00	0.00	0.00	0.00	0.00	282.45	282.45	0.00
Northern Marianas	0.00	0.00	0.00	0.00	0.00	0.00	1.09	1.09	0.00
Ohio	1,179.32	114,619.61	594.20	24,407.00	701,014.90	2,688.95	797,972.72	1,642,476.71	0.00
Oklahoma	75,000.20	93,942.22	141,695.00	357.50	0.00	1,572.60	92,344.56	404,912.08	0.96
Oregon	0.00	75.30	1,983.00	13,901.69	0.00	191.12	48,545.78	64,696.89	2.00
Pennsylvania	379,501.60	89,755.52	304,180.87	388.30	202,628.57	8,166.38	76,417.67	1,061,038.91	4,615.04
Puerto Rico	0.00	1,617.00	35,963.00	0.00	0.00	6.91	815.45	38,402.36	1.52
Rhode Island	0.00	1.10	0.01	26.00	0.00	0.10	1,008.16	1,035.37	166.90
South Carolina	503,728.00	35,616.12	52,055.96	0.00	97,084.20	3,307.74	155,630.00	847,422.02	0.00
South Dakota	0.00	0.00	0.00	0.00	0.00	1,169.90	502.35	1,672.25	0.00
Tennessee	100,693.34	21,428.18	3,420,437.56	968.60	566,810.27	1,171.90	82,681.92	4,194,191.77	0.00
Texas	188,967.01	54,847.10	2,190,260.63	41,350.50	693,963.32	31,625.53	81,440.70	3,282,454.79	446.45
Utah	972.59	1.60	0.00	0.00	7,703.53	379.32	9,133.34	18,190.38	42.72
Vermont	0.00	719.00	0.00	3.20	0.00	0.00	284.62	1,006.82	0.00
Virgin Islands	0.00	0.00	0.00	0.00	0.00	0.00	2,542.03	2,542.03	0.00
Virginia	13.10	5,021.76	0.00	214.29	60,078.30	568.26	9,069.05	74,964.76	320.27
Washington	78,702.00	0.00	102,727.70	3.70	488,625.96	632.10	390,844.14	1,061,535.60	1,173.80
West Virginia	3,460.00	1,952.00	13.68	0.00	9,304.70	0.00	328,426.61	343,156.99	59.00
Wisconsin	7,609.00	3,575.10	7.10	106.00	63,513.00	161.20	3,126.53	78,097.93	0.00
Wyoming	0.00	0.00	20,065.00	0.00	1,300.00	68.73	4,187.40	25,621.13	46.33
Total	**2,181,079.52**	**860,183.75**	**10,401,981.02**	**178,811.78**	**8,181,690.39**	**180,866.39**	**3,017,847.94**	**25,002,460.79**	**18,875.05**

Note: Data are from Section 8 of Form R.

by 20.6 percent from 2001 to 2002. The increase between 2002 and 2003 was projected to occur primarily in quantities burned for energy recovery on-site and in quantities released on- and off-site. On- and off-site releases are the least-desirable outcome under the waste management hierarchy described in **Waste Management** in Chapter 1 (Figure 1-2).

The actual change in polycyclic aromatic compounds in production-related waste from the prior

Table 3-58: TRI On-site and Off-site Releases, by Industry, 2001: Polycyclic Aromatic Compounds

			On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
SIC Code	Industry	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
10	Metal Mining	9	2,421.36	0.00	0.00	0.00	0.00	423.40	2,844.76	0.00	2,844.76
20	Food	259	108,618.46	0.00	0.00	0.00	3.50	38.84	108,660.80	51.50	108,712.30
21	Tobacco	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Textiles	173	44,581.09	0.00	0.00	0.00	0.00	0.00	44,581.09	0.02	44,581.11
24	Lumber	77	3,754.74	175.92	0.00	0.00	0.00	17.75	3,948.40	14,833.60	18,782.00
26	Paper	310	59,978.57	1,118.17	0.00	0.00	0.00	1,716.72	62,813.46	703.48	63,516.94
27	Printing	8	5,465.00	0.00	0.00	0.00	0.00	0.00	5,465.00	0.00	5,465.00
28	Chemicals	294	52,203.71	8,796.49	1.10	0.00	422.00	9,712.59	71,135.89	433,827.77	504,963.66
29	Petroleum	573	149,722.37	5,482.49	0.00	0.00	38.84	4,756.79	160,000.48	232,776.31	392,776.79
30	Plastics	130	20,238.12	0.25	0.00	0.00	0.00	5.69	20,244.06	226,120.16	246,364.23
31	Leather	6	26.16	0.00	0.00	0.00	0.00	0.00	26.16	0.00	26.16
32	Stone/Clay/Glass	49	20,126.01	0.00	0.00	332.95	0.00	4,611.05	25,070.01	687.20	25,757.21
33	Primary Metals	114	528,211.56	628.07	0.00	0.00	0.00	1,756.00	530,595.63	624,008.70	1,154,604.33
34	Fabricated Metals	34	3,257.92	0.00	0.00	0.00	0.00	0.00	3,257.92	0.00	3,257.92
35	Machinery	30	9,684.85	0.00	0.00	0.00	0.00	5.00	9,689.85	0.00	9,689.85
36	Electrical Equip.	63	43,921.83	165.64	0.00	0.00	0.00	33,533.70	77,621.17	42,753.94	120,375.11
37	Transportation Equip.	89	19,341.60	0.00	0.00	0.00	0.00	79.05	19,420.65	158.00	19,578.65
38	Measure/Photo.	27	12,594.44	2.00	0.00	0.00	0.00	0.00	12,596.44	7.81	12,604.25
39	Miscellaneous	20	840.04	0.00	0.00	0.00	0.00	0.00	840.04	577.20	1,417.24
--	Multiple codes 20-39	152	64,256.76	507.18	0.00	0.00	2,112.00	4,862.90	71,738.84	20,025.30	91,764.14
--	No codes 20-39	26	5,099.64	0.00	0.00	0.00	0.00	4,887.01	9,986.65	5,801.00	15,787.65
491/493	Electric Utilities	654	8,558.64	39.91	0.00	0.00	0.00	3,705.11	12,303.66	8,990.69	21,294.35
5169	Chemical Wholesale Distributors	5	3.40	0.00	0.00	0.00	0.00	0.00	3.40	0.00	3.40
5171	Petroleum Terminals/Bulk Storage	607	14,352.76	147.44	0.00	0.00	3.00	786.43	15,289.63	2,723.89	18,013.52
7389/4953	Hazardous Waste/Solvent Recovery	102	322.25	6.21	1.00	0.00	94,514.71	394.49	95,238.66	8,738.32	103,976.98
	Total	**3,813**	**1,177,581.28**	**17,069.76**	**2.10**	**332.95**	**97,094.05**	**71,292.51**	**1,363,372.65**	**1,622,784.90**	**2,986,157.55**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Table 3-59: Quantities of TRI Chemicals in Waste, by Industry, 2001: Polycyclic Aromatic Compounds

		Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Wast Managed	Non-production-related Waste Managed
SIC Code	Industry	On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
10	Metal Mining	0.00	0.00	0.00	29.60	0.00	118.70	2,844.76	2,993.06	0.00
20	Food	0.00	1.25	1,128,843.97	0.00	69,350.94	48.00	106,633.86	1,304,878.02	528.90
21	Tobacco	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Textiles	0.00	0.00	34,699.00	0.00	0.00	2.42	44,261.26	78,962.68	320.29
24	Lumber	7,905.30	15.30	433,915.20	24,489.10	12,214.90	94,519.60	38,412.60	611,472.00	837.30
26	Paper	0.00	0.10	45,999.04	98.00	17,422.18	1,293.70	81,199.00	146,012.02	1.21
27	Printing	0.00	0.00	0.00	0.00	0.00	0.00	5,465.00	5,465.00	0.00
28	Chemicals	15,262.20	148,826.00	3,225,185.99	65,381.49	615,394.55	55,433.95	502,085.12	4,627,569.30	943.13
29	Petroleum	412,150.57	339,821.55	162,106.80	77,433.64	816,361.86	8,516.14	406,938.35	2,223,328.91	8,422.10
30	Plastics	75,237.61	108,654.39	3,234.00	2,055.30	24,000.00	2,894.44	238,179.17	454,254.91	10.00
31	Leather	0.00	0.00	577.00	2.91	0.00	0.00	26.16	606.07	0.00
32	Stone/Clay/Glass	0.00	0.00	6,208.00	14.80	746.30	0.00	25,100.50	32,069.60	676.20
33	Primary Metals	1,278,683.60	39,739.70	5,336.00	216.30	1,198,353.70	5,034.20	1,167,679.87	3,695,043.37	917.00
34	Fabricated Metals	0.00	0.00	0.00	2.00	0.00	0.00	3,258.00	3,260.00	0.00
35	Machinery	0.00	0.00	0.00	21.71	0.00	0.00	9,689.85	9,711.56	0.37
36	Electrical Equip.	191,849.00	18,855.55	3,607,429.24	730.08	1,390,775.92	161.93	109,582.74	5,319,384.46	16.13
37	Transportation Equip.	0.00	19.35	0.00	1.20	90.10	178.40	19,531.25	19,820.30	21.30
38	Measure/Photo.	0.00	1.00	0.00	28.00	24.00	0.00	12,609.12	12,662.12	0.00
39	Miscellaneous	0.00	0.00	0.00	0.00	0.00	1,960.00	1,417.24	3,377.24	0.00
--	Multiple codes 20-39	103,288.79	71,667.50	105,161.00	0.70	62,723.50	630.21	90,710.24	434,181.94	4,756.41
--	No codes 20-39	96,151.00	0.00	1,081.22	0.00	77.00	4,914.00	10,908.65	113,131.87	1,069.00
491/493	Electric Utilities	37.00	1,630.79	1,639,892.55	652.71	3,263,994.50	96.45	21,301.32	4,927,605.31	81.15
5169	Chemical Wholesale Distributors	0.00	0.00	0.00	0.00	0.00	0.22	3.40	3.62	0.00
5171	Petroleum Terminals/Bulk Storage	514.45	1,166.28	0.01	824.65	47.00	1,970.46	16,032.68	20,555.53	274.55
7389/4953	Hazardous Waste/Solvent Recovery	0.00	129,785.00	2,312.00	6,829.59	710,113.94	3,093.56	103,977.81	956,111.90	0.00
	Total	**2,181,079.52**	**860,183.75**	**10,401,981.02**	**178,811.78**	**8,181,690.39**	**180,866.39**	**3,017,847.94**	**25,002,460.79**	**18,875.05**

Note: Data are from Section 8 of Form R.

Table 3-60: Prior Year, Current Year and Projected Quantities of TRI Chemicals in Waste, 2000-2003: Polycyclic Aromatic Compounds

Waste Management Activity	Prior Year 2000		Current Year 2001		Projected 2002		Projected 2003	
	Total Pounds	Percent of Total	Total Pounds	Percent of Total	Total Pounds	Percent of Total	Total Pounds	Percent of Total
Recycled On-site	2,647,037.50	8.2	2,181,079.52	8.7	2,214,718.13	9.8	2,284,627.14	9.7
Recycled Off-site	597,242.14	1.9	860,183.75	3.4	871,214.83	3.9	833,543.63	3.5
Energy Recovery On-site	10,916,400.73	33.8	10,401,981.02	41.6	8,256,968.81	36.6	8,711,357.68	36.8
Energy Recovery Off-site	207,581.52	0.6	178,811.78	0.7	160,980.06	0.7	148,867.05	0.6
Treated On-site	12,964,525.14	40.2	8,181,690.39	32.7	8,165,114.33	36.2	8,385,797.73	35.4
Treated Off-site	245,409.93	0.8	180,866.39	0.7	144,337.75	0.6	156,810.59	0.7
Quantity Released On- and Off-site	4,700,580.14	14.6	3,017,847.94	12.1	2,769,650.40	12.3	3,145,009.26	13.3
Total Production-related Waste Managed	**32,278,777.10**	**100.0**	**25,002,460.79**	**100.0**	**22,582,984.30**	**100.0**	**23,666,013.07**	**100.0**

Waste Management Activity	Change 2000-2001 Percent	Projected Change 2001-2002 Percent	Projected Change 2002-2003 Percent	Projected Change 2001-2003 Percent
Recycled On-site	-17.6	1.5	3.2	4.7
Recycled Off-site	44.0	1.3	-4.3	-3.1
Energy Recovery On-site	-4.7	-20.6	5.5	-16.3
Energy Recovery Off-site	-13.9	-10.0	-7.5	-16.7
Treated On-site	-36.9	-0.2	2.7	2.5
Treated Off-site	-26.3	-20.2	8.6	-13.3
Quantity Released On- and Off-site	-35.8	-8.2	13.6	4.2
Total Production-related Waste Managed	**-22.5**	**-9.7**	**4.8**	**-5.3**

Note: Data from Section 8 of Form R for 2001.

year of 2000 to 2001 was a decrease of 22.5 percent, from 32.3 million pounds to 25.0 million pounds. This decrease occurred primarily in the amount treated on-site, which decreased by 36.9 percent. All types of waste management except for off-site recycling decreased from 2000 to 2001.

Source Reduction

In 2001, 284 forms were filed reporting source reduction activities for polycyclic aromatic compounds (see Table 3-61). As noted in **Waste Management** in Chapter 1, source reduction—an activity that prevents the generation of waste—is preferred to waste management. These 284 forms represented 7.4 percent of all forms submitted for polycyclic aromatic compounds in 2001.

The most frequently reported source reduction activity was good operating practices (listed on 120 forms). Spill and leak prevention came next, with 77 forms, followed by process modifications, with 53 forms.

On- and Off-site Releases, 2000-2001

On- and off-site releases of polycyclic aromatic compounds decreased from 5.0 million pounds to 3.0 million pounds from 2000 to 2001, a decrease of 39.8 percent (see Table 3-62). On-site releases of polycyclic aromatic compounds decreased by 25.6 percent (468,125 pounds), including a decrease in air emissions of 337,452 pounds or 22.3 percent. On-site land releases decreased by 129,946 pounds or 43.6 percent, including a decrease of 26.3 per-

Table 3-61: Number of Forms Reporting Source Reduction Activity, by Category, 2001: Polycyclic Aromatic Compounds

CAS Number	Chemical	Total Form Rs	Forms Reporting Source Reduction Activity		Category of Source Reduction Activity							
					Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Materials Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
		Number	Number	Percent of All Form Rs	Number	Number	Number	Number	Number	Number	Number	Number
191-24-2	Benzo(g,h,i)perylene	1,509	106	7.0	51	3	26	6	18	0	1	1
--	Polycyclic aromatic compounds	2,304	178	7.7	69	8	51	11	35	0	1	3
	Total	**3,813**	**284**	**7.4**	**120**	**11**	**77**	**17**	**53**	**0**	**2**	**4**

Note: All source reduction activities on a form are counted in the corresponding category. Totals do not equal the sum of the categories because forms may report more than one source reduction activity.

Table 3-62: TRI On-site and Off-site Releases, 2000-2001: Polycyclic Aromatic Compounds

	2000 Number	2001 Number	Change 2000-2001 Number	Change 2000-2001 Percent
Forms	3,684	3,813	129	3.5
	Pounds	**Pounds**	**Pounds**	**Percent**
Total Air Emissions	1,515,033.49	1,177,581.28	-337,452.21	-22.3
Surface Water Discharges	18,130.85	17,069.76	-1,061.10	-5.9
Underground Injection	0.00	335.05	335.05	--
Class I Wells	0.00	2.10	2.10	--
Class II-V Wells	0.00	332.95	332.95	--
On-site Land Releases	298,333.04	168,386.56	-129,946.48	-43.6
RCRA Subtitle C Landfills	201,581.64	97,094.05	-104,487.60	-51.8
Other On-site Land Releases	96,751.40	71,292.51	-25,458.88	-26.3
Total On-site Releases	1,831,497.38	1,363,372.65	-468,124.73	-25.6
Off-site Releases				
Storage Only*	922.16	409.90	-512.26	-55.6
Solidification/Stabilization**	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Wastewater Treatment (Excluding POTWs)***	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Transfers to POTWs****	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Underground Injection	0.00	1,183.00	1,183.00	--
Landfills/Surface Impoundments	2,859,999.68	1,486,035.30	-1,373,964.38	-48.0
Land Treatment	365.63	185.99	-179.64	-49.1
Other Land Disposal	113,211.93	97,790.86	-15,421.07	-13.6
Other Off-site Management	209.59	98.21	-111.38	-53.1
Transfers to Waste Broker for Disposal	52,541.06	32,262.44	-20,278.62	-38.6
Unknown*****	101,051.53	4,819.19	-96,232.34	-95.2
Total Off-site Releases (Transfers Off-site to Disposal)	**3,128,301.59**	**1,622,784.90**	**-1,505,516.69**	**-48.1**
Total On- and Off-site Releases	**4,959,798.97**	**2,986,157.55**	**-1,973,641.42**	**-39.8**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

* Storage only (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to storage only are included as a form of disposal (off-site release). See Box 1-5.

** Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal cateogry compounds (waste treatment code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste treatment code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 1-6. Reports under code M40 of metals and metal category compounds have been included in solidification/stabilization of metals and metal cateogry compounds in this report.

*** Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal category compounds (waste treatment code M61) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste treatment code M60). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 1-6. Transfers of metals and metal category compounds reported under code M60 have been included in transfers of metals and metal category compounds to wastewater treatment.

**** Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal category compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

***** Unknown (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as unknown transfers are treated as a form of disposal (off-site release).

cent in on-site releases to RCRA subtitle C landfills and a 25.6 percent decrease in releases to other on-site landfills. Surface water discharges also decreased, by 5.9 percent or 1,061 pounds.

Off-site releases (transfers to disposal) also decreased from 2000 to 2001. The decrease was 1.5 million pounds or 48.1 percent. This was primarily due to decreases in the amount of polycyclic aromatic compounds sent to landfills/surface impoundments. Such transfers decreased by 1.4 million pounds or 48.0 percent from 2000 to 2001.

Waste Management Data, 2000-2001

Quantities of TRI Chemicals in Waste, 2000-2001

Polycyclic aromatic compounds in production-related waste decreased from 30.0 million pounds in 2000 to 25.0 million pounds in 2001, a decrease of 16.6 percent (see Table 3-63). The amount treated on-site decreased by 2.6 million pounds or 24.4 percent. The quantity released on- and off-site decreased by 2.1 million pounds or 40.8 percent and on-site recycling decreased by 448,444 pounds or 17.1 percent.

Table 3-63: Quantities of TRI Chemicals in Waste by Waste Management Activity, 2000-2001: Polycyclic Aromatic Compounds

	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Recycled On-site	2,629,523.72	2,181,079.52	-448,444.20	-17.1
Recycled Off-site	628,115.68	860,183.75	232,068.07	36.9
Energy Recovery On-site	10,317,360.58	10,401,981.02	84,620.43	0.8
Energy Recovery Off-site	212,600.51	178,811.78	-33,788.73	-15.9
Treated On-site	10,824,267.94	8,181,690.39	-2,642,577.55	-24.4
Treated Off-site	258,769.07	180,866.39	-77,902.68	-30.1
Quantity Released On- and Off-site	5,094,811.48	3,017,847.94	-2,076,963.55	-40.8
Total Production-related Waste Managed	**29,965,448.99**	**25,002,460.79**	**-4,962,988.20**	**-16.6**
Non-production-related Waste Managed	64,761.24	18,875.05	-45,886.19	-70.9

Note: Data are from Section 8 of Form R of year indicated.

Increases were reported in the amount of polycyclic aromatic compounds in waste recycled off-site, an increase of 232,068 pounds or 36.9 percent. The amount of polycyclic aromatic compounds in waste burned for energy recovery on-site also increased, by 84,620 pounds.

Transfers Off-site for Further Waste Management, including Disposal, 2000-2001

As shown in Table 3-64, transfers off-site for further waste management, including disposal, of polycyclic aromatic compounds decreased from 2000 to 2001, by 1.5 million pounds or 34.3 percent. Other off-site transfers to disposal decreased by 1.6 million pounds or 49.5 percent. Polycyclic aromatic compounds in waste sent for treatment also decreased, by 126,546 pounds or 51.4 percent.

Increases were reported in the amount of polycyclic aromatic compounds sent off-site for recycling. Such transfers increased by 273,949 pounds or 42.6 percent from 2000 to 2001. Transfers to POTWs of polycyclic aromatic compounds also increased, by 1,242 pounds or 24.2 percent.

Table 3-64: TRI Transfers Off-site for Further Waste Management, including Disposal, 2000-2001: Polycyclic Aromatic Compounds

	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Transfers to Recycling	643,173.29	917,122.25	273,948.97	42.6
Transfers to Energy Recovery	213,601.42	186,014.86	-27,586.57	-12.9
Transfers to Treatment	246,117.52	119,571.52	-126,545.99	-51.4
Transfers to POTWs	5,135.53	6,377.58	1,242.06	24.2
Metals and Metal Category Compounds Only	0.00	0.00	0.00	--
Non-metal TRI Chemicals	5,135.53	6,377.58	1,242.06	24.2
Other Off-site Transfers*	12.00	105.82	93.82	781.8
Other Off-site Transfers to Disposal**	3,309,397.06	1,671,426.45	-1,637,970.62	-49.5
Total Transfers for Further Waste Management, including Disposal	**4,417,436.82**	**2,900,618.49**	**-1,516,818.33**	**-34.3**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

Polychlorinated Biphenyls (PCBs)

INTRODUCTION

Polychlorinated biphenyls, otherwise known as PCBs, were first created in 1881, and commercial manufacture began in 1929. PCBs were commercially produced by the chlorination of a biphenyl with anhydrous chlorine using iron filings or ferric chloride as a catalyst. Domestic production of PCBs was banned in 1976 under the Toxic Substances Control Act (TSCA). PCBs were used in a wide range of applications (electrical transformers and capacitors, hydraulic systems, heat transfer systems, and carbonless copy paper, among others), owing to a rare combination of properties, including high dielectric constant (good insulator), low flammability, high heat capacity, low chemical reactivity, long-term resistance to degradation, and low acute toxicity. PCBs are a group of 209 halogenated aromatic hydrocarbons that were commercially used and sold as a mixture of isomers. Of the 209 possible PCBs, only about 100 individual isomers are likely to occur at significant concentrations in commercial PCB mixtures.

More details on PCBs, their sources, chemical characteristics, health and environmental effects and efforts being undertaken to reduce pollution from PCBs can be found in the *2000 Toxics Release Inventory Public Data Release Report* (EPA 260-R-02-003).

2001 TRI DATA FOR POLYCHLORINATED BIPHENYLS

On-site and Off-site Releases, 2001

As shown in Table 3-65, there were 137 TRI forms submitted for polychlorinated biphenyls for 2001. On- and off-site releases for polychlorinated biphenyls totaled 2.5 million pounds. On-site releases to land to RCRA subtitle C landfills were the largest type of release, accounting for 90.4 percent of total releases or 2.3 million pounds (see Figure 3-13). The second largest release type was other on-site land releases, which accounted for 9.0 percent or 225,686 pounds. (Types of on-site land releases are described in Box 1-4 in Chapter 1.)

Much smaller amounts of other types of releases were reported. Off-site releases (transfers to disposal) totaled 12,251 pounds; air emissions were 1,360 pounds; and releases to surface water and underground injection of polychlorinated biphenyls totaled less than 3 pounds.

Waste Management Data, 2001

Quantities of TRI Chemicals in Waste

Polychlorinated biphenyls in production-related waste totaled 4.1 million pounds in 2001, as shown in Table 3-66. Most (2.5 million pounds or 61.7 percent) of the total was released on- and off-site (see Figure 3-14).

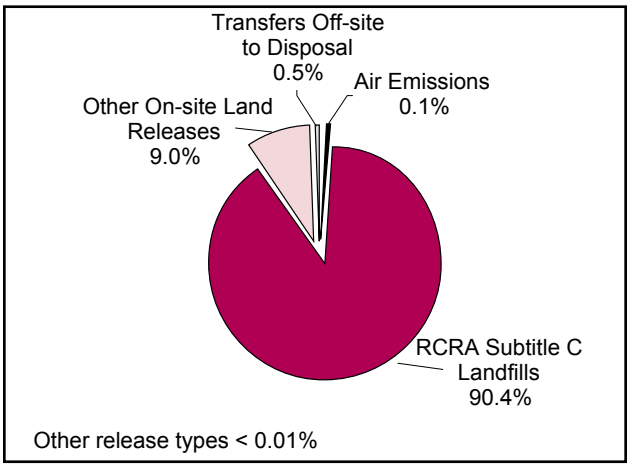
Another 1.3 million pounds of polychlorinated biphenyls were treated on-site, accounting for 31.8

Table 3-65: TRI On-site and Off-site Releases, 2001: Polychlorinated Biphenyls

			On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
CAS Number	Chemical	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
1336-36-3	Polychlorinated biphenyls (PCBs)	137	1,359.90	2.80	0.00	0.00	2,265,476.30	225,685.85	2,492,524.85	12,251.02	2,504,775.86

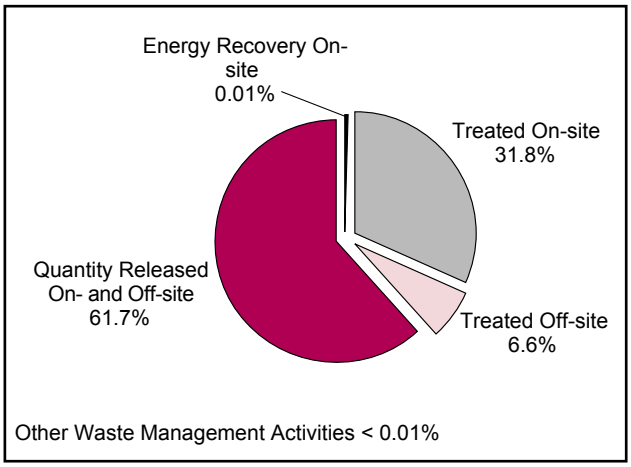
Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Figure 3-13: Distribution of TRI On-site and Off-site Releases, 2001: Polychlorinated Biphenyls



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Figure 3-14: Distribution of Quantities of TRI Chemicals in Waste, 2001: Polychlorinated Biphenyls



Note: Data are from Section 8 of Form R.

percent of the total in production-related waste in 2001. Treatment off-site was 270,767 pounds or 6.6 percent. Other types of waste management totaled less than 1,000 pounds.

Transfers Off-site for Further Waste Management, including Disposal

Transfers off-site for further waste management, including disposal, of polychlorinated biphenyls totaled 375,854 pounds in 2001 (see Table 3-67).

Transfers to treatment accounted for 84.1 percent of the transfers off-site for further waste management, including disposal, of polychlorinated biphenyls in 2001 (see Figure 3-15). Transfers to treatment totaled 316,076 pounds. Other transfers to disposal were 58,828 pounds or 15.7 percent of total transfers for further waste management, including disposal, of polychlorinated biphenyls for 2001. Other types of transfers totaled less than 1,000 pounds.

TRI Data by State

Facilities in North Carolina, with 10 forms, submitted the largest number of forms in 2001 for polychlorinated biphenyls. Texas facilities submitted 9 forms and Ohio facilities submitted 8 forms.

On- and Off-site Releases

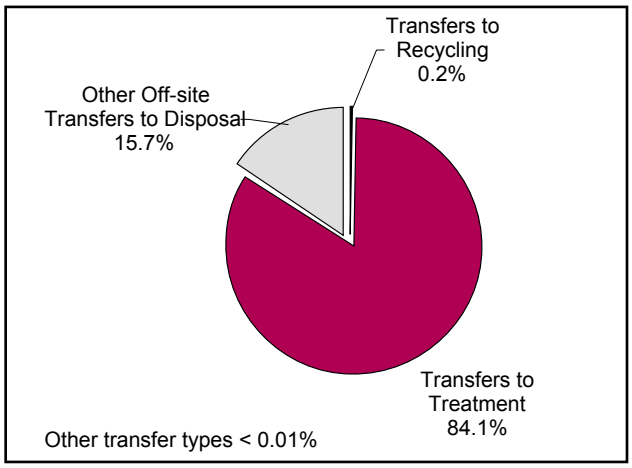
In 2001, facilities in Michigan reported the largest total on- and off-site releases of polychlorinated biphenyls (see Table 3-68). They reported a total of 1.2 million pounds, or 49.9 percent of the total for 2001. Oregon accounted for 672,885 pounds, which was 26.9 percent of the total. The states with the third and fourth largest amounts were Alabama, which reported 200,230 pounds or 8.0 percent of the total, and Utah, which reported 184,759 pounds or 7.4 percent of the total.

Table 3-66: Quantities of TRI Chemicals in Waste, 2001: Polychlorinated Biphenyls

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
1336-36-3	Polychlorinated biphenyls (PCBs)	355.10	121.88	400.00	54.40	1,310,735.30	270,767.30	2,545,407.33	4,127,841.31	23,202.59

Note: Data are from Section 8 of Form R.

Figure 3-15: Distribution of TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Polychlorinated Biphenyls



Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.

Almost all (over 99.8 percent or 1.2 million pounds) of Michigan's releases of polychlorinated biphenyls were on-site land releases to RCRA subtitle C landfills. The same was true for Oregon and Alabama. Oregon reported 94.6 percent of its total releases as on-site land releases to RCRA subtitle C landfills and Alabama reported 99.9 percent (636,791 pounds and 200,000 pounds, respectively). Almost all of Utah's total releases were other on-site land releases (that is, other than RCRA subtitle C landfills), with 183,565 pounds or 99.4 percent of its total releases.

As shown in Map 3-5, releases of polychlorinated biphenyls are quite concentrated geographically. Four states, Michigan, Oregon, Alabama, and Utah, released over 100,000 pounds. The total releases from these four states represented 92.1 percent of total releases of polychlorinated biphenyls in 2001.

Waste Management Data

Michigan had the largest quantity of polychlorinated biphenyls in production-related waste of any state in 2001 (see Table 3-69). Michigan reported 1.3 million pounds of total production-related waste and accounted for 30.3 percent of the total. Utah ranked second with 1.1 million pounds (27.3 percent of the total).

Over 99 percent of production-related waste in Michigan was released on- or off-site. The 1.3 million pounds released on- or off-site in Michigan accounted for 49.1 percent of all on- or off-site release of polychlorinated biphenyls in 2001. Utah facilities reported 942,270 pounds treated on-site, which was 71.9 percent of the total polychlorinated biphenyls treated on-site in 2001.

TRI Data by Industry

On- and Off-site Releases

The hazardous waste/solvent recovery industries reported the largest total releases of any industry sector, with 2.5 million pounds or 99.5 percent of the total releases on- and off-site of polychlorinated biphenyls in 2001 (see Table 3-70). The hazardous waste/solvent recovery industries also reported the largest amounts of on-site land releases, both releases to RCRA subtitle C landfills and other on-site land releases, with 2.3 million pounds to RCRA subtitle C landfills and 220,048 pounds of other on-site land releases.

Table 3-67: TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Polychlorinated Biphenyls

CAS Number	Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs: Metals and Metal Category Compounds Pounds	Transfers to POTWs: Non-metal TRI Chemicals Pounds	Other Off-site Transfers* Pounds	Other Off-site Transfers to Disposal** Pounds	Total Transfers for Further Waste Management, including Disposal Pounds
1336-36-3	Polychlorinated biphenyls (PCBs)	927.79	19.69	316,076.12	0.00	3.08	0.00	58,827.72	375,854.40

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

Table 3-68: TRI On-site and Off-site Releases, by State, 2001: Polychlorinated Biphenyls

State	Total Forms	On-site Releases							Off-site Releases	Total On- and Off-site Releases
				Underground Injection		On-site Land Releases		Total On-site Releases	Transfers Off-site to Disposal	
		Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases			
	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	4	130.33	0.00	0.00	0.00	200,000.00	0.00	200,130.33	100.00	200,230.33
Arizona	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	726.00	726.00
Arkansas	2	0.25	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25
California	7	0.11	0.00	0.00	0.00	16,353.00	3.00	16,356.11	24.02	16,380.12
Connecticut	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Delaware	1	0.00	0.28	0.00	0.00	0.00	0.32	0.60	71.20	71.80
Florida	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10
Georgia	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Idaho	1	1.66	0.00	0.00	0.00	6,097.00	0.00	6,098.66	0.00	6,098.66
Illinois	3	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.49	0.50
Indiana	4	11.17	0.00	0.00	0.00	0.00	2,042.00	2,053.17	0.24	2,053.41
Iowa	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.00	47.00
Kansas	3	146.00	0.28	0.00	0.00	0.00	0.00	146.28	822.24	968.52
Kentucky	5	18.25	0.00	0.00	0.00	0.00	395.45	413.70	0.80	414.50
Louisiana	4	0.00	0.00	0.00	0.00	30.00	0.00	30.00	706.00	736.00
Maine	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maryland	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	10.00
Massachusetts	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	277.00	277.00
Michigan	5	95.00	0.00	0.00	0.00	1,247,638.00	0.00	1,247,733.00	1,974.14	1,249,707.14
Minnesota	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,295.21	1,295.21
Mississippi	2	0.00	0.00	0.00	0.00	0.00	163.70	163.70	0.00	163.70
Missouri	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nebraska	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nevada	2	0.00	0.00	0.00	0.00	88,326.00	0.00	88,326.00	0.00	88,326.00
New Jersey	3	0.61	0.00	0.00	0.00	0.00	0.00	0.61	20.53	21.14
New York	7	235.40	0.24	0.00	0.00	0.00	1,600.00	1,835.64	3,689.86	5,525.50
North Carolina	10	647.10	0.00	0.00	0.00	0.00	0.00	647.10	0.00	647.10
Ohio	8	0.00	0.00	0.00	0.00	51.00	0.00	51.00	460.60	511.60
Oklahoma	2	20.00	0.00	0.00	0.00	69,557.00	0.00	69,577.00	0.00	69,577.00
Oregon	4	0.00	0.00	0.00	0.00	636,791.30	36,093.38	672,884.68	0.00	672,884.68
Pennsylvania	7	17.32	0.00	0.00	0.00	0.00	0.00	17.32	156.00	173.32
Puerto Rico	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rhode Island	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.83
South Carolina	4	21.01	0.00	0.00	0.00	0.00	0.00	21.01	0.00	21.01
South Dakota	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tennessee	5	1.24	0.00	0.00	0.00	0.00	1,823.00	1,824.24	275.63	2,099.87
Texas	9	7.05	2.00	0.00	0.00	616.00	0.00	625.05	46.33	671.38
Utah	3	4.00	0.00	0.00	0.00	17.00	183,565.00	183,586.00	1,173.10	184,759.10
Virginia	2	1.24	0.00	0.00	0.00	0.00	0.00	1.24	294.70	295.94
Washington	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West Virginia	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wisconsin	3	2.15	0.00	0.00	0.00	0.00	0.00	2.15	79.00	81.15
Total	**137**	**1,359.90**	**2.80**	**0.00**	**0.00**	**2,265,476.30**	**225,685.85**	**2,492,524.85**	**12,251.02**	**2,504,775.86**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

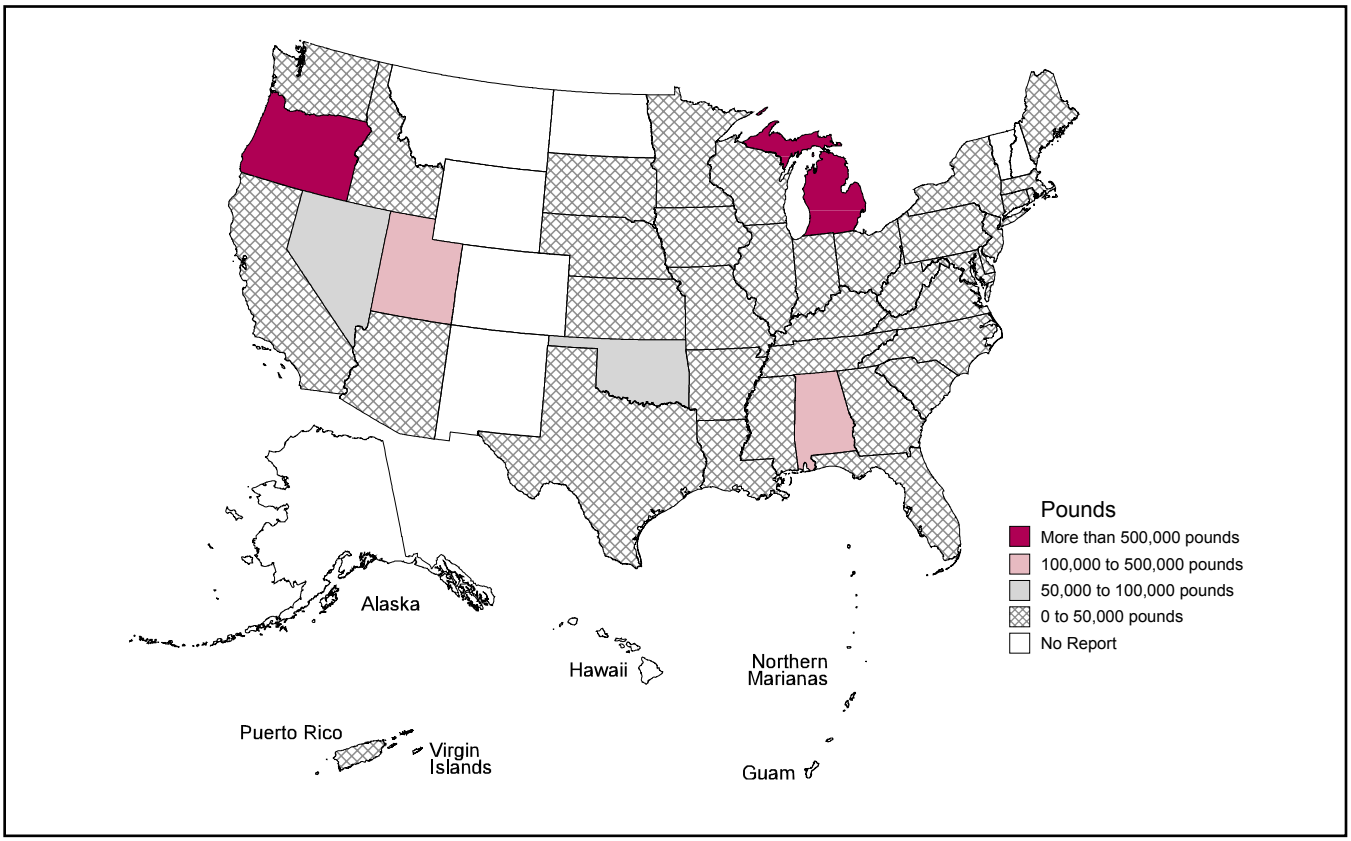
The primary metals industry had the second largest total releases, with 9,061 pounds of total releases, 63.5 percent of which were off-site releases (transfers off-site to disposal). These transfers off-site to disposal of 5,751 pounds were the largest amount of polychlorinated biphenyls in 2001 released off-site for any industry.

The machinery industry reported the third largest total releases of polychlorinated biphenyls in 2001, with 2,042 pounds of total releases, all of which were other on-site land releases (that is, other than RCRA subtitle C landfills). The electric utilities industry reported the largest amount of air emissions, with 685 pounds.

Waste Management

The hazardous waste/solvent recovery industries reported the largest amount of polychlorinated biphenyls in production-related waste in 2001 (see Table 3-71). With 4.1 million pounds of polychlorinated biphenyls in production-related waste, the

Map 3-5: Total On- and Off-site Releases, 2001: Polychlorinated Biphenyls



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

hazardous waste/solvent recovery industries accounted for 98.6 percent of the polychlorinated biphenyls in waste. A total of 2.5 million pounds of polychlorinated biphenyls were released on- or off-site by the hazardous waste/solvent recovery industries. These 2.5 million pounds represented 62.3 percent of these industries' polychlorinated biphenyls in production-related waste. The hazardous waste/solvent recovery industries also treated on-site 1.3 million pounds, which was 31.8 percent of its total production-related waste.

The chemical manufacturing industry reported the second largest amount of polychlorinated biphenyls in production-related waste in 2001, with a total of 36,664 pounds. This was less than one percent of total production-related waste of polychlorinated biphenyls in 2001. More than half (55.4 percent or 20,294 pounds) of the chemical industry's polychlorinated biphenyls in production-related waste was treated off-site, more than one-third (40.5 percent or 14,841 pounds) was treated on-site and 3.3 percent or 1,217 pounds were released on- and off-site.

The primary metals industry reported the third largest amount of polychlorinated biphenyls in production-related waste of polychlorinated biphenyls in 2001, with a total of 10,475 pounds, with 6,202 pounds (59.2 percent of its polychlorinated biphenyls in production-related waste) treated off-site and 4,208 pounds (40.2 percent) released on- and off-site.

Table 3-69: Quantities of TRI Chemicals in Waste, by State, 2001: Polychlorinated Biphenyls

State	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
Alabama	0.00	0.00	0.00	0.00	0.00	81,021.00	200,261.50	281,282.50	0.00
Arizona	0.00	0.00	0.00	0.00	0.00	25,745.40	726.00	26,471.40	0.00
Arkansas	0.00	0.00	0.00	0.00	0.00	2.04	12.80	14.84	0.00
California	355.10	36.08	0.00	0.00	0.00	26,325.00	16,763.03	43,479.21	0.00
Connecticut	0.00	0.00	0.00	0.00	14.41	0.00	0.00	14.41	0.00
Delaware	0.00	0.00	0.00	0.00	0.00	0.00	71.80	71.80	0.00
Florida	0.00	0.10	0.50	0.00	0.00	2.80	0.10	3.50	2.80
Georgia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Idaho	0.00	0.00	0.00	0.00	0.00	0.00	6,097.00	6,097.00	0.00
Illinois	0.00	0.00	0.00	0.00	98.00	190.00	0.50	288.50	0.00
Indiana	0.00	0.00	0.00	0.00	1.99	2,042.00	2,172.20	4,216.19	2,042.00
Iowa	0.00	26.70	0.00	0.00	29.00	0.00	47.00	102.70	213.00
Kansas	0.00	0.00	0.00	0.00	0.00	26,333.00	45,932.00	72,265.00	0.00
Kentucky	0.00	0.00	0.00	0.00	773.00	656.00	414.50	1,843.50	0.00
Louisiana	0.00	0.00	0.00	0.00	14,585.00	167.97	737.00	15,489.97	115.76
Maine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maryland	0.00	0.00	0.00	0.00	0.00	10.00	0.00	10.00	0.00
Massachusetts	0.00	0.00	0.00	0.00	0.00	83,594.00	277.00	83,871.00	0.00
Michigan	0.00	6.00	0.00	18.00	850.90	21.68	1,250,115.17	1,251,011.75	0.00
Minnesota	0.00	0.00	0.00	0.00	0.00	0.15	1,066.21	1,066.36	229.00
Mississippi	0.00	0.00	0.00	0.00	0.00	0.00	163.70	163.70	0.00
Missouri	0.00	0.00	15.00	0.00	0.00	0.00	0.00	15.00	0.00
Nebraska	0.00	0.00	0.00	0.00	1,438.00	0.00	0.00	1,438.00	0.00
Nevada	0.00	0.00	0.00	36.40	0.00	212.00	88,326.00	88,574.40	0.00
New Jersey	0.00	0.00	0.00	0.00	45.00	0.00	21.94	66.94	0.00
New York	0.00	0.00	0.00	0.00	0.00	89.24	264.46	353.70	20,200.00
North Carolina	0.00	0.00	25.10	0.00	0.00	254.02	648.00	927.12	0.00
Ohio	0.00	0.00	0.00	0.00	136.00	54.10	104.10	294.20	400.00
Oklahoma	0.00	0.00	0.00	0.00	0.00	0.00	69,577.00	69,577.00	0.00
Oregon	0.00	0.00	0.00	0.00	0.00	3,565.60	672,884.50	676,450.10	0.03
Pennsylvania	0.00	53.00	15.40	0.00	0.00	390.00	188.95	647.35	0.00
Puerto Rico	0.00	0.00	0.00	0.00	0.00	468.00	0.00	468.00	0.00
Rhode Island	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.83	0.00
South Carolina	0.00	0.00	0.00	0.00	0.00	0.00	21.01	21.01	0.00
South Dakota	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tennessee	0.00	0.00	0.00	0.00	26,521.00	18,879.00	2,159.60	47,559.60	0.00
Texas	0.00	0.00	312.00	0.00	323,973.00	281.30	1,217.23	325,783.53	0.00
Utah	0.00	0.00	0.00	0.00	942,270.00	2.00	184,759.10	1,127,031.10	0.00
Virginia	0.00	0.00	0.00	0.00	0.00	0.00	295.94	295.94	0.00
Washington	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West Virginia	0.00	0.00	0.00	0.00	0.00	436.00	0.00	436.00	0.00
Wisconsin	0.00	0.00	32.00	0.00	0.00	25.00	81.15	138.15	0.00
Total	**355.10**	**121.88**	**400.00**	**54.40**	**1,310,735.30**	**270,767.30**	**2,545,407.33**	**4,127,841.31**	**23,202.59**

Note: Data are from Section 8 of Form R.

Projected Quantities of TRI Chemicals Managed in Waste, 2001-2003

TRI facilities expected to decrease the quantity of polychlorinated biphenyls in production-related waste between 2001 and 2003 by 11.0 percent, from 4.1 million pounds to 3.7 million pounds (see Table 3-72). The decrease was projected to occur in the amount released on- and off-site, which was expected to decrease by 17.8 percent. On- and off-site releases are the least-desirable outcome under the waste management hierarchy described in **Waste Management** in Chapter 1 (Figure 1-2). The projected decrease from 2001 to 2002 was 4.0 percent (from 4.1 million pounds to 4.0 million pounds), and the projected decrease from 2002 to 2003 was 7.3 percent.

The actual change from the prior year of 2000, to 2001 was a decrease of 63.3 percent, from 11.2 million pounds to 4.1 million pounds.

Source Reduction

In 2001, 13 forms were filed reporting source reduction activities for polychlorinated biphenyls (see Table 3-73). As noted in **Waste Management** in Chapter 1, source reduction—an activity that pre-

Table 3-70: TRI On-site and Off-site Releases, by Industry, 2001: Polychlorinated Biphenyls

SIC Code	Industry	Total Forms	On-site Releases							Off-site Releases	Total On- and Off-site Releases
					Underground Injection		On-site Land Releases				
			Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
20	Food	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Textiles	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Lumber	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Paper	11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	138.15	138.15
28	Chemicals	32	18.06	2.28	0.00	0.00	0.00	311.02	331.36	770.79	1,102.15
29	Petroleum	3	0.10	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10
32	Stone/Clay/Glass	2	226.00	0.00	0.00	0.00	0.00	0.00	226.00	0.00	226.00
33	Primary Metals	20	24.41	0.24	0.00	0.00	0.00	3,285.00	3,309.65	5,751.03	9,060.68
35	Machinery	2	0.00	0.00	0.00	0.00	0.00	2,042.00	2,042.00	0.00	2,042.00
36	Electrical Equip.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	61.00	61.00
37	Transportation Equip.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	100.00
38	Measure/Photo.	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	Miscellaneous	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
--	Multiple codes 20-39	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
--	No codes 20-39	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
491/493	Electric Utilities	18	685.11	0.00	0.00	0.00	0.00	0.00	685.11	0.12	685.22
5171	Petroleum Terminals/Bulk Storage	4	2.15	0.00	0.00	0.00	0.00	0.00	2.15	0.67	2.82
7389/4953	Hazardous Waste/Solvent Recovery	28	404.07	0.28	0.00	0.00	2,265,476.30	220,047.83	2,485,928.48	5,429.26	2,491,357.74
	Total	**137**	**1,359.90**	**2.80**	**0.00**	**0.00**	**2,265,476.30**	**225,685.85**	**2,492,524.85**	**12,251.02**	**2,504,775.86**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

vents the generation of waste—is preferred to waste management. These 13 forms represented 9.5 percent of all forms submitted for polychlorinated biphenyls in 2001.

The most frequently reported source reduction activities were spill and leak prevention and raw materials modifications, each listed on 4 forms.

On- and Off-site Releases, 2000-2001

On- and off-site releases of polychlorinated biphenyls increased from 1.4 million pounds to 2.5 million pounds from 2000 to 2001, an increase of 73.6 percent (see Table 3-74). This was due to an increase in on-site land releases, which increased by 1.1 million pounds or 74.0 percent. Releases to

Table 3-71: Quantities of TRI Chemicals in Waste, by Industry, 2001: Polychlorinated Biphenyls

SIC Code	Industry	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Wast Managed	Non-production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
20	Food	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	Textiles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	Lumber	0.00	0.00	0.00	0.00	0.00	3,427.00	0.00	3,427.00	0.00
26	Paper	0.00	0.00	32.00	0.00	0.00	25.32	138.98	196.30	0.00
28	Chemicals	0.00	0.00	312.00	0.00	14,841.41	20,293.78	1,216.60	36,663.79	515.76
29	Petroleum	355.10	24.00	0.00	0.00	0.00	44.20	0.01	423.31	0.00
32	Stone/Clay/Glass	0.00	0.00	15.40	0.00	0.00	0.00	226.00	241.40	0.00
33	Primary Metals	0.00	0.00	0.00	36.40	29.00	6,202.37	4,207.53	10,475.30	20,642.00
35	Machinery	0.00	0.00	0.00	0.00	0.00	2,042.00	2,042.00	4,084.00	2,042.00
36	Electrical Equip.	0.00	0.00	0.00	0.00	0.00	61.00	0.00	61.00	0.00
37	Transportation Equip.	0.00	0.00	0.00	0.00	0.00	121.00	121.00	242.00	0.00
38	Measure/Photo.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	Miscellaneous	0.00	26.70	0.00	0.00	0.00	0.00	0.00	26.70	0.00
--	Multiple codes 20-39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
--	No codes 20-39	0.00	0.00	0.00	0.00	0.00	264.02	0.00	264.02	0.00
491/493	Electric Utilities	0.00	65.18	40.60	0.00	12.90	2.80	686.12	807.60	2.80
5171	Petroleum Terminals/Bulk Storage	0.00	0.00	0.00	0.00	1.99	12.90	15.48	30.37	0.00
7389/4953	Hazardous Waste/Solvent Recovery	0.00	6.00	0.00	18.00	1,295,850.00	238,270.91	2,536,753.60	4,070,898.51	0.03
	Total	**355.10**	**121.88**	**400.00**	**54.40**	**1,310,735.30**	**270,767.30**	**2,545,407.33**	**4,127,841.31**	**23,202.59**

Note: Data are from Section 8 of Form R.

Table 3-72: Prior Year, Current Year and Projected Quantities of TRI Chemicals in Waste, 2000-2003: Polychlorinated Biphenyls

Waste Management Activity	Prior Year 2000		Current Year 2001		Projected 2002		Projected 2003	
	Total Pounds	Percent of Total	Total Pounds	Percent of Total	Total Pounds	Percent of Total	Total Pounds	Percent of Total
Recycled On-site	358.00	0.0	355.10	0.0	360.00	0.0	360.00	0.0
Recycled Off-site	141.30	0.0	121.88	0.0	90.20	0.0	90.20	0.0
Energy Recovery On-site	1,410.77	0.0	400.00	0.0	388.70	0.0	388.90	0.0
Energy Recovery Off-site	17.00	0.0	54.40	0.0	25.43	0.0	25.43	0.0
Treated On-site	10,085,373.28	89.8	1,310,735.30	31.8	1,302,814.88	32.9	1,302,854.88	35.5
Treated Off-site	264,209.63	2.4	270,767.30	6.6	279,543.90	7.1	277,170.29	7.5
Quantity Released On- and Off-site	881,985.35	7.9	2,545,407.33	61.7	2,380,342.58	60.1	2,091,882.36	57.0
Total Production-related Waste Managed	**11,233,495.33**	**100.0**	**4,127,841.31**	**100.0**	**3,963,565.69**	**100.0**	**3,672,772.06**	**100.0**
Waste Management Activity	**Change 2000-2001** Percent		**Projected Change 2001-2002** Percent		**Projected Change 2002-2003** Percent		**Projected Change 2001-2003** Percent	
Recycled On-site	-0.8		1.4		0.0		1.4	
Recycled Off-site	-13.7		-26.0		0.0		-26.0	
Energy Recovery On-site	-71.6		-2.8		0.1		-2.8	
Energy Recovery Off-site	220.0		-53.3		0.0		-53.3	
Treated On-site	-87.0		-0.6		0.0		-0.6	
Treated Off-site	2.5		3.2		-0.8		2.4	
Quantity Released On- and Off-site	188.6		-6.5		-12.1		-17.8	
Total Production-related Waste Managed	**-63.3**		**-4.0**		**-7.3**		**-11.0**	

Note: Data from Section 8 of Form R for 2001.

RCRA subtitle C landfills increased by 891,282 pounds and to other on-site landfills by 168,142 pounds.

On-site air releases of polychlorinated biphenyls also increased from 2000 to 2001, by 202 pounds or 17.4 percent. Other on-site releases, including surface water discharges and underground injection, decreased.

Off-site releases (transfers to disposal) of polychlorinated biphenyls increased from 2000 to 2001. The increase was 2,045 pounds or 20.0 percent. Transfers to landfills/surface impoundments increased by 6,064 pounds, from 4,370 pounds in 2000 to 10,434 pounds in 2001. Not all types of transfers to disposal showed increases, however.

Transfers to waste brokers for disposal showed decreases overall, of 4,419 pounds, or 86.7 percent.

Waste Management Data, 2000-2001

Quantities of TRI Chemicals in Waste, 2000-2001

Polychlorinated biphenyls in production-related waste decreased from 13.8 million pounds in 2000 to 4.1 million pounds in 2001, a decrease of 70.1 percent (see Table 3-75). The amount treated on-site decreased by 10.6 million pounds or 89.0 percent. The amount treated off-site also decreased, by 144,396 pounds or 34.8 percent.

However, the quantity of polychlorinated biphenyls released on- and off-site increased by 1.1 million pounds or 71.6 percent from 2000 to 2001.

Table 3-73: Number of Forms Reporting Source Reduction Activity, by Category, 2001: Polychlorinated Biphenyls

CAS Number	Chemical	Total Form Rs	Forms Reporting Source Reduction Activity		Category of Source Reduction Activity							
					Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Materials Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
		Number	Number	Percent of All Form Rs	Number	Number	Number	Number	Number	Number	Number	Number
1336-36-3	Polychlorinated biphenyls (PCBs)	137	13	9.5	2	1	4	4	2	0	0	0

Note: All source reduction activities on a form are counted in the corresponding category. Totals do not equal the sum of the categories because forms may report more than one source reduction activity.

Table 3-74: TRI On-site and Off-site Releases, 2000-2001: Polychlorinated Biphenyls

	2000 Number	2001 Number	Change 2000-2001 Number	Change 2000-2001 Percent
Forms	162	137	-25	-15.4
	Pounds	**Pounds**	**Pounds**	**Percent**
Total Air Emissions	1,158.00	1,359.90	201.89	17.4
Surface Water Discharges	28.82	2.80	-26.02	-90.3
Underground Injection	0.60	0.00	-0.60	-100.0
Class I Wells	0.60	0.00	-0.60	-100.0
Class II-V Wells	0.00	0.00	0.00	--
On-site Land Releases	1,431,738.80	2,491,162.15	1,059,423.35	74.0
RCRA Subtitle C Landfills	1,374,194.80	2,265,476.30	891,281.50	64.9
Other On-site Land Releases	57,544.00	225,685.85	168,141.85	292.2
Total On-site Releases	**1,432,926.22**	**2,492,524.85**	**1,059,598.63**	**73.9**
Off-site Releases				
Storage Only*	386.30	10.00	-376.30	-97.4
Solidification/Stabilization**	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Wastewater Treatment (Excluding POTWs)***	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Transfers to POTWs****	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Underground Injection	0.00	4.00	4.00	--
Landfills/Surface Impoundments	4,369.55	10,433.85	6,064.30	138.8
Land Treatment	0.00	0.00	0.00	--
Other Land Disposal	75.90	127.60	51.70	68.1
Other Off-site Management	188.41	174.74	-13.67	-7.3
Transfers to Waste Broker for Disposal	5,097.11	678.34	-4,418.77	-86.7
Unknown*****	88.33	822.49	734.16	831.2
Total Off-site Releases (Transfers Off-site to Disposal)	**10,205.60**	**12,251.02**	**2,045.42**	**20.0**
Total On- and Off-site Releases	**1,443,131.82**	**2,504,775.86**	**1,061,644.04**	**73.6**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

* Storage only (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to storage only are included as a form of disposal (off-site release). See Box 1-5.

** Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal cateogry compounds (waste treatment code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste treatment code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 1-6. Reports under code M40 of metals and metal category compounds have been included in solidification/stabilization of metals and metal cateogry compounds in this report.

*** Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal category compounds (waste treatment code M61) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste treatment code M60). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 1-6. Transfers of metals and metal category compounds reported under code M60 have been included in transfers of metals and metal category compounds to wastewater treatment.

**** Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal category compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

***** Unknown (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as unknown transfers are treated as a form of disposal (off-site release).

Table 3-75: Quantities of TRI Chemicals in Waste by Waste Management Activity, 2000-2001: Polychlorinated Biphenyls

Waste Management Activity	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Recycled On-site	358.00	355.10	-2.90	-0.8
Recycled Off-site	611.65	121.88	-489.77	-80.1
Energy Recovery On-site	1,410.77	400.00	-1,010.77	-71.6
Energy Recovery Off-site	10,517.00	54.40	-10,462.60	-99.5
Treated On-site	11,906,010.11	1,310,735.30	-10,595,274.81	-89.0
Treated Off-site	415,163.21	270,767.30	-144,395.91	-34.8
Quantity Released On- and Off-site	1,483,299.33	2,545,407.33	1,062,107.99	71.6
Total Production-related Waste Managed	**13,817,370.07**	**4,127,841.31**	**-9,689,528.77**	**-70.1**
Non-production-related Waste Managed	22,247.24	23,202.59	955.35	4.3

Note: Data are from Section 8 of Form R of year indicated.

Table 3-76: TRI Transfers Off-site for Further Waste Management, including Disposal, 2000-2001: Polychlorinated Biphenyls

	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Transfers to Recycling	765.22	927.79	162.57	21.2
Transfers to Energy Recovery	10,481.15	19.69	-10,461.46	-99.8
Transfers to Treatment	408,787.25	316,076.12	-92,711.13	-22.7
Transfers to POTWs	224.71	3.08	-221.63	-98.6
Metals and Metal Category Compounds Only	0.00	0.00	0.00	--
Non-metal TRI Chemicals	224.71	3.08	-221.63	-98.6
Other Off-site Transfers*	0.00	0.00	0.00	--
Other Off-site Transfers to Disposal**	34,528.32	58,827.72	24,299.40	70.4
Total Transfers for Further Waste Management, including Disposal	**454,786.65**	**375,854.40**	**-78,932.25**	**-17.4**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

Much smaller amounts of polychlorinated biphenyls were reported as recycled or in waste burned for energy recovery and the amounts decreased from 2000 to 2001 in these categories.

Transfers Off-site for Further Waste Management, including Disposal, 2000-2001

As shown in Table 3-76, total transfers off-site for further waste management, including disposal, of polychlorinated biphenyls decreased from 2000 to 2001, by 78,932 pounds or 17.4 percent. Transfers to treatment decreased by 92,711 pounds or 22.7 percent. Polychlorinated biphenyls in waste sent for energy recovery also decreased, by 10,461 pounds or 99.8 percent.

Increases were reported in the amount of polychlorinated biphenyls in other off-site transfers to disposal. Such transfers increased by 24,299 pounds or 70.4 percent.

Pesticides

INTRODUCTION

This section contains a discussion of the pesticides that have been classified as PBT chemicals: aldrin, chlordane, heptachlor, isodrin, methoxychlor, pendimethalin, toxaphene, and trifluralin.

Aldrin is an organochlorine compound first introduced to the U.S. in 1950 as a cotton pesticide. Pure aldrin is a white powder with a mild chemical odor. The less pure commercial powders have a tan color. Aldrin does not occur naturally in the environment. It was used as an insecticide from the 1950s to early 1970s on cotton and corn crops. In 1974, all uses except termite control were canceled under FIFRA[1] and production in the United States ceased. Aldrin has not been imported since 1985 due to health concerns and insect resistance.

Chlordane is an organochlorine compound used as a general pesticide. Pure chlordane is a white crystalline solid with a mild, pungent odor. It was first marketed in 1948 in a variety of formulations. Chlordane was once widely used as an insecticide on corn, citrus, and home gardens and as a fumigant in termite and carpenter ant control. Concern over the health effects and particularly the carcinogenicity of chlordane lead to an eventual ban on all domestic uses of chlordane in 1988.

Heptachlor is an organochlorine insecticide produced by the chlorination of chlordane. Technical heptachlor contains 20 percent chlordane and is a mixture of heptachlor and many related chemicals. Heptachlor does not occur naturally in the environment. It is a white powder that smells like mothballs. Heptachlor was first registered in the U.S. in 1952 for use as a general insecticide on a wide range of agricultural crops. Heptachlor was also used for home and garden insect control, for termite control, and as a seed treatment. In 1974, EPA issued a Notice of Intent to Cancel all registered uses of heptachlor except those for subterranean termite control and dipping of non-food plants. In March 1978, most other uses of heptachlor were canceled. Its use is now severely restricted and is presently only used in the U.S. to control fire ants in buried, pad-mounted electric power transformers and in underground cable television and telephone cable boxes.

Isodrin is an insecticide which is no longer used or manufactured in the U.S. Isodrin is a white crystalline solid. Isodrin is made from the slow reaction of cyclopentadiene with the condensation product of vinyl chloride and hexachlorocyclopentadiene.

Methoxychlor is an organochlorine used as a general insecticide. It is a pale-yellow powder with a slightly fruity or musty odor. However, it is available in many forms, including powders, emulsifiable concentrates, granules, and an aerosol. Methoxychlor is similar in structure to dichlorodiphenyltrichloroethane (DDT), but it is less toxic. Methoxychlor is used on agricultural crops, livestock, grain storage, home gardens, and pets. EPA has approved the use of methoxychlor as a pesticide and fumigant on more than 85 crops such as fruits, vegetables, forage crops, and shade trees. It may also be applied to large areas such as beaches, estuaries, and marshes for control of flies and mosquito larvae and may be used for spray treatment of barns, grain bins, mushroom houses, other agricultural premises, and garbage and sewage areas.

Pendimethalin is used as an insecticide and herbicide. It is also known as benzenamine. Pendimethalin was first registered as a pesticide in 1972 and marketed in 1976. Pendimethalin is an orange-yellow crystalline solid and is formulated as a liquid, solid, granular, and an emulsifiable concentrate. It is used as a pre-emergence and post-emergence herbicide on cotton, dry bulbs, onions, dry bulb shallots, edible beans, corn, legumes, garlic, grain, nonbearing fruit, nut crops, peanuts, pota-

[1]FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act

toes, rice, soybeans, sugar cane, sunflowers, sweet corn, and sweet lupine. It is also used for pre-emergence control of many annual grasses and certain broadleaf weeds. Pendimethalin is applied by broadcasting, directed spray, and soil treatment.

Toxaphene is a polychlorinated camphene, which was widely used as an insecticide in the U.S. until 1990. Toxaphene is a man-made mixture containing more than 670 chemicals. It is a yellow or amber, waxy solid that smells like turpentine. Toxaphene is an insecticide that was primarily used in the southern U.S. to control pests on cotton, vegetables, livestock and poultry, soybeans, and alfalfa, wheat, and sorghum. Other uses included controlling unwanted fish growth in lakes and pests on livestock. All registered uses of toxaphene in the U.S. were canceled in 1990. It is still commonly used as an insecticide on bananas and pineapples in Puerto Rico and the Virgin Islands.

Trifluralin is an herbicide used primarily on cotton and soybean crops. Trifluralin is a yellow-orange crystalline solid. Production of trifluralin has declined since restrictions on product formulation were implemented in 1982 due to carcinogenicity and mutagenicity concerns. It is used on soybean crops, cotton, wheat, alfalfa, sunflowers and many other crops.

More details on these pesticides, their sources, chemical characteristics, health and environmental effects and efforts being undertaken to reduce pollution from the pesticides can be found in the *2000 Toxics Release Inventory Public Data Release Report* (EPA 260-R-02-003).

2001 TRI DATA FOR PESTICIDES

On-site and Off-site Releases, 2001

As shown in Table 3-77, there were 130 TRI forms submitted for the group of eight pesticides subject to the lower reporting thresholds for PBT chemicals for 2001. On- and off-site releases for these pesticides totaled 111,262 pounds.

Pendimethalin had the largest releases of this group, with 79,488 pounds or 71.4 percent of the total releases of the eight pesticides. Trifluralin had the second largest releases, with 22,516 pounds or 20.2 percent of the total releases.

Off-site releases (transfers to disposal) were the largest type of release for the group of pesticides, accounting for 45.7 percent of total releases or 50,845 pounds (see Figure 3-16). The second largest release type was other on-site land releases (that is, other than RCRA subtitle C landfills), which accounted for 34.4 percent or 38,278 pounds. (Types of on-site land releases are described in Box 1-4 in Chapter 1.)

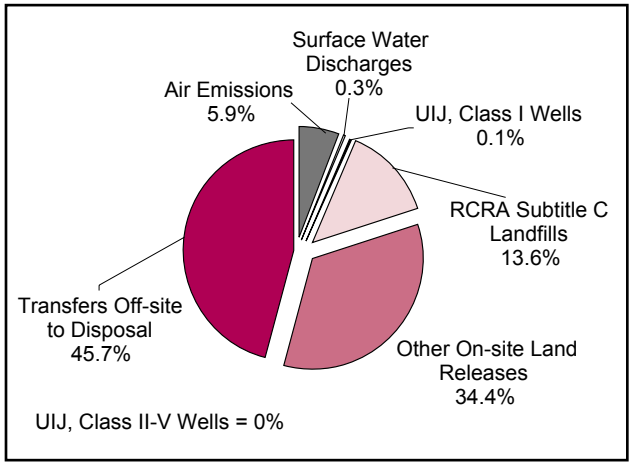
On-site releases to RCRA subtitle C landfills totaled 15,183 pounds or 13.6 percent and air emissions were 6,560 pounds or 5.9 percent. Surface water discharges and underground injection of these pesticides totaled 397 pounds.

Table 3-77: TRI On-site and Off-site Releases, 2001: Pesticides

			On-site Releases							Off-site Releases	Total
					Underground Injection		On-site Land Releases				
CAS Number	Chemical	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
309-00-2	Aldrin	8	0.31	0.00	0.00	0.00	0.00	0.00	0.31	1.07	1.38
57-74-9	Chlordane	20	15.49	80.00	0.00	0.00	3,630.30	0.00	3,725.79	331.61	4,057.40
76-44-8	Heptachlor	15	6.04	0.00	0.00	0.00	271.69	0.00	277.73	28.24	305.97
465-73-6	Isodrin	5	0.35	0.00	0.00	0.00	19.00	0.00	19.35	441.40	460.75
72-43-5	Methoxychlor	15	25.19	0.00	0.00	0.00	334.69	0.00	359.88	95.93	455.81
40487-42-1	Pendimethalin	18	3,573.66	195.00	0.00	0.00	185.00	28,832.00	32,785.66	46,702.21	79,487.87
8001-35-2	Toxaphene	18	42.34	6.29	0.14	0.00	3,073.89	0.00	3,122.66	854.53	3,977.18
1582-09-8	Trifluralin	31	2,896.17	1.00	115.00	0.00	7,668.00	9,445.70	20,125.87	2,390.11	22,515.98
	Total	**130**	**6,559.55**	**282.29**	**115.14**	**0.00**	**15,182.57**	**38,277.70**	**60,417.25**	**50,845.10**	**111,262.34**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Figure 3-16: Distribution of TRI On-site and Off-site Releases, 2001: Pesticides



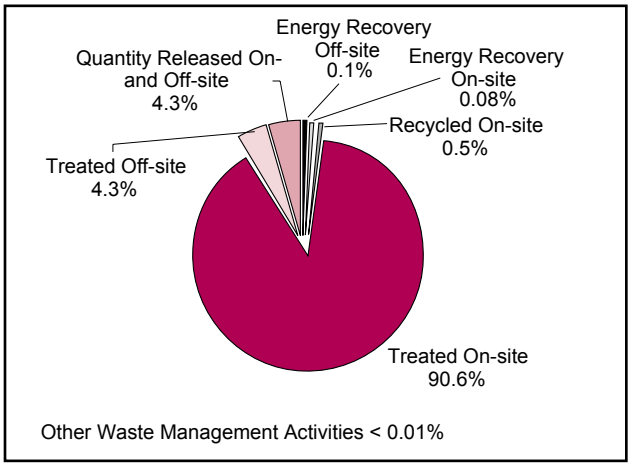
Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

UIJ = Underground injection

Trifluralin had the largest on-site land releases to RCRA subtitle C landfills, with 7,668 pounds which was one-half of the releases to RCRA subtitle C landfills reported for all eight pesticides in 2001.

Pendimethalin had the largest other on-site land releases, with 28,832 pounds or 75.3 percent of the total of such releases for the eight pesticides, the largest off-site releases (transfers to disposal) with 46,702 pounds or 91.9 percent of the total off-site releases, and the largest air emissions, with 3,574 pounds or 54.5 percent of the total air releases of the pesticides in 2001.

Figure 3-17: Distribution of Quantities of TRI Chemicals in Waste, 2001: Pesticides



Note: Data are from Section 8 of Form R.

Waste Management Data, 2001

Quantities of TRI Chemicals in Waste

The quantity of pesticides in production-related waste totaled 2.7 million pounds in 2001, as shown in Table 3-78. Most (2.4 million pounds or 90.6 percent) of the quantity in production-related waste was treated on-site (see Figure 3-17). Another 4.3 percent (115,494 pounds) was released on- and off-site and 4.3 percent (115,391 pounds) was treated off-site. Other types of waste management totaled less than one percent.

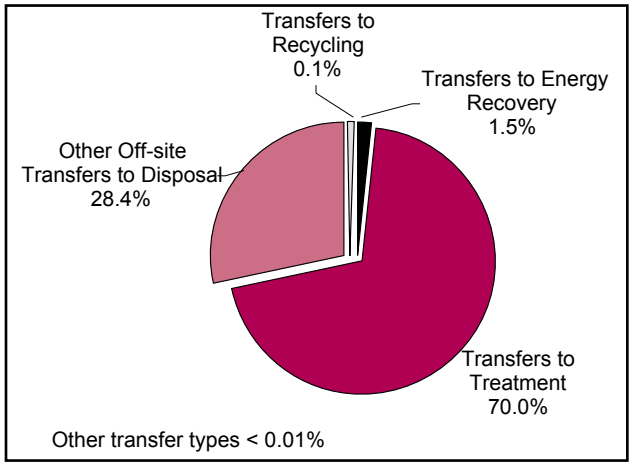
The chemical heptachlor had the largest production-related waste, accounting for 28.3 percent (752,719 pounds) of production-related waste for all eight pesticides. Most of the heptachlor in production-related waste was treated on-site. The 751,862 pounds of heptachlor treated on-site represented

Table 3-78: Quantities of TRI Chemicals in Waste, 2001: Pesticides

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
309-00-2	Aldrin	0.00	0.00	0.00	306.00	58,529.00	24.00	18.38	58,877.38	0.00
57-74-9	Chlordane	0.00	0.00	244.00	0.00	463,839.30	457.00	4,024.29	468,564.59	0.00
76-44-8	Heptachlor	0.00	0.00	45.00	334.00	751,861.74	173.00	305.73	752,719.47	0.02
465-73-6	Isodrin	0.00	0.00	0.00	0.00	3,800.00	142.00	465.19	4,407.19	0.00
72-43-5	Methoxychlor	0.00	0.00	569.00	1,376.00	319,545.30	231.40	12,093.69	333,815.39	0.00
40487-42-1	Pendimethalin	6,000.00	0.00	0.00	0.00	390,997.29	34,656.00	71,546.00	503,199.29	0.00
8001-35-2	Toxaphene	0.00	3.00	1,138.00	7.20	124,183.14	464.80	4,378.99	130,175.13	0.00
1582-09-8	Trifluralin	7,702.00	0.00	0.00	626.00	297,841.95	79,243.00	22,661.75	408,074.70	679.00
	Total	**13,702.00**	**3.00**	**1,996.00**	**2,649.20**	**2,410,597.72**	**115,391.20**	**115,494.02**	**2,659,833.14**	**679.02**

Note: Data are from Section 8 of Form R.

Figure 3-18: Distribution of TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Pesticides



Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.

99.9 percent of total production-related waste of heptachlor in 2001.

The chemical pendimethalin accounted for 503,199 pounds or 18.9 percent of the total of this group of pesticides in production-related waste. Pendimethalin also accounted for the largest quantity released on- or off-site, with 71,546 pounds or 61.9 percent of the total amount released on- or off-site.

The chemical chlordane accounted for 17.6 percent or 468,565 pounds of the pesticide chemicals in production-related waste, most of which was treated on-site. Trifluralin accounted for 408,075 pounds (15.3 percent of the total).

Transfers Off-site for Further Waste Management, including Disposal

Transfers off-site for further waste management, including disposal, of this group of eight pesticides totaled almost 181,969 pounds in 2001 (see Table 3-79). Transfers to treatment accounted for 70.0 percent of the total transfers for further waste management, including disposal, of the pesticides in 2001 (see Figure 3-18). Transfers to treatment were 127,371 pounds. Other transfers to disposal were 51,760 pounds or 28.4 percent of total transfers for further waste management, including disposal, of these pesticides for 2001. Other types of transfers were about 2,838 pounds.

The chemical trifluralin accounted for 46.0 percent (83,676 pounds) of total transfers for further waste management, including disposal, of these pesticides for 2001. Most (95.6 percent or 79,974 pounds) of this was transferred to treatment.

Pendimethalin accounted for 44.7 percent or 81,358 pounds of total transfers for further waste management, including disposal. A total of 57.4 percent of it (46,702 pounds) was transferred to disposal and 42.6 percent (34,656 pounds) to treatment.

Table 3-79: TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Pesticides

CAS Number	Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs: Metals and Metal Category Compounds Pounds	Transfers to POTWs: Non-metal TRI Chemicals Pounds	Other Off-site Transfers* Pounds	Other Off-site Transfers to Disposal** Pounds	Total Transfers for Further Waste Management, including Disposal Pounds
309-00-2	Aldrin	0.00	306.00	11.00	0.00	0.00	0.00	1.07	318.07
57-74-9	Chlordane	0.00	0.00	425.00	0.00	0.00	0.00	331.61	756.61
76-44-8	Heptachlor	8.00	334.00	116.00	0.00	0.00	0.00	28.24	486.24
465-73-6	Isodrin	2.00	0.00	142.00	0.00	0.00	0.00	443.63	587.63
72-43-5	Methoxychlor	0.00	1,376.00	11,846.00	0.00	0.00	0.00	95.93	13,317.93
40487-42-1	Pendimethalin	0.00	0.00	34,656.00	0.00	0.00	0.00	46,702.21	81,358.21
8001-35-2	Toxaphene	169.00	7.15	200.82	0.00	1.00	0.00	1,090.14	1,468.11
1582-09-8	Trifluralin	0.00	625.00	79,974.00	0.00	10.00	0.00	3,067.11	83,676.11
	Total	**179.00**	**2,648.15**	**127,370.82**	**0.00**	**11.00**	**0.00**	**51,759.94**	**181,968.91**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

TRI Data by State

Facilities in Ohio, with 18 forms, and Texas, with 11 forms, submitted the largest number of forms in 2001 for the group of eight PBT chemical pesticides. All other states had 10 or fewer forms submitted.

On- and Off-site Releases

In 2001, facilities in Florida reported the largest total on- and off-site releases of these pesticides (see Table 3-80), a total of 62,875 pounds, or 56.5 percent of the total for 2001.

Georgia reported the second largest total releases, with 10,429 pounds representing 9.4 percent of total releases of this group of pesticides. Kansas reported the third largest amount with 9,580 pounds, which was 8.6 percent of the total.

Most of Florida's releases of these pesticides were off-site releases (transfers to disposal). The 40,724 pounds of such releases in Florida represented 80.1 percent of the total of off-site releases for this group of pesticides. Florida also accounted for the largest amount of other on-site land releases (that is, other than RCRA subtitle C landfills) with 20,889 pounds, or 54.6 percent of the total amount of other on-site land releases.

As shown in Map 3-6, two states, Florida and Georgia, each released over 10,000 pounds of the eight PBT chemical pesticides in 2001. Nine other states each released over 1,000 pounds.

Waste Management Data

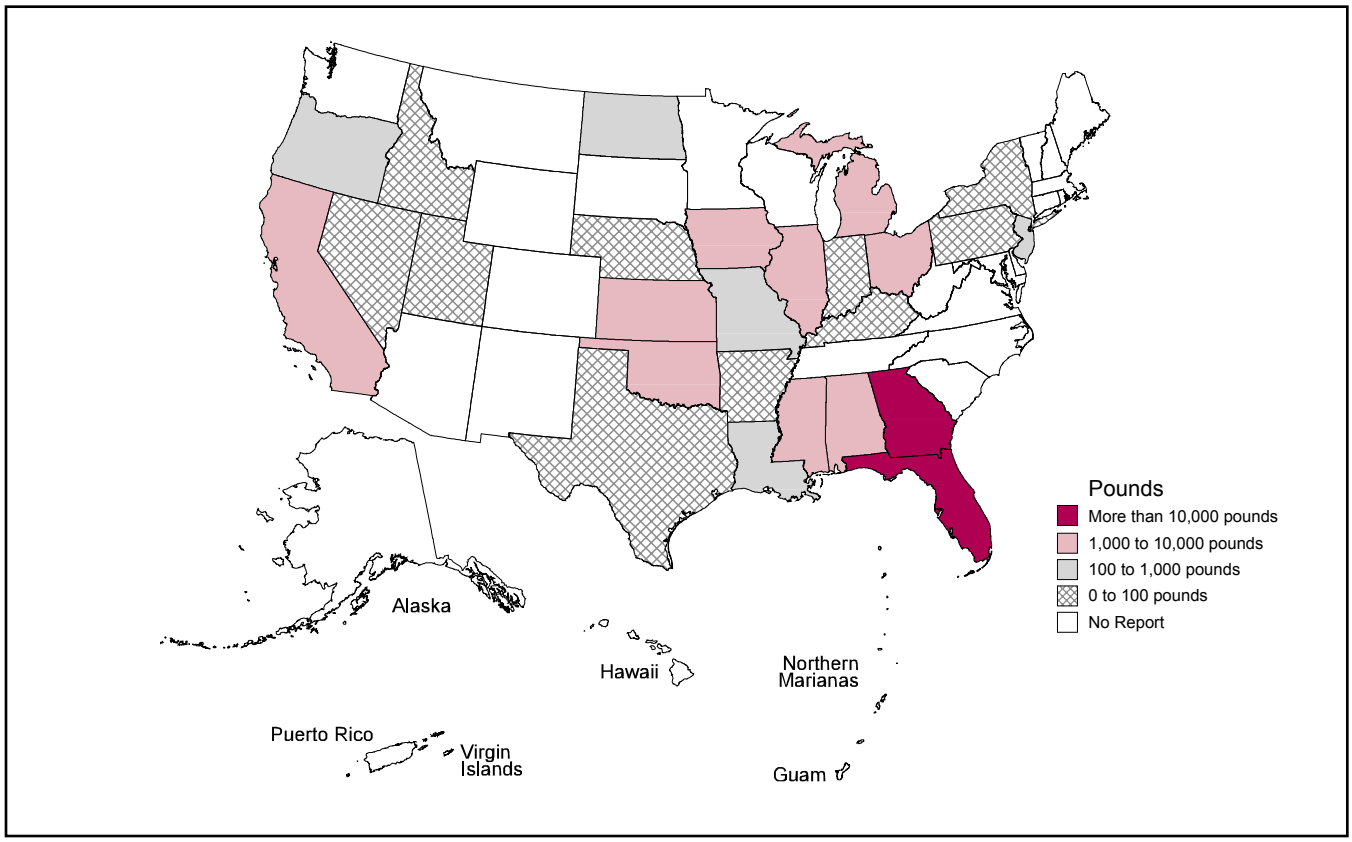
The state with the largest quantity of this group of eight pesticides in production-related waste in 2001 was Texas (see Table 3-81). Texas reported 681,452 pounds and accounted for 25.6 percent of these chemicals in production-related waste. Ohio ranked second with 654,754 pounds (24.6 percent of the

Table 3-80: TRI On-site and Off-site Releases, by State, 2001: Pesticides

		On-site Releases							Off-site Releases	Total On- and Off-site Releases
				Underground Injection		On-site Land Releases				
State	Total Forms	Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	
	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	5	1.56	0.00	0.00	0.00	2,661.00	418.00	3,080.56	0.00	3,080.56
Arkansas	9	24.10	0.00	0.00	0.00	0.00	0.00	24.10	0.00	24.10
California	7	316.00	0.00	0.00	0.00	3,666.70	0.00	3,982.70	450.00	4,432.70
Florida	3	1,262.00	0.00	0.00	0.00	0.00	20,889.00	22,151.00	40,724.00	62,875.00
Georgia	3	180.00	0.00	0.00	0.00	2,275.00	7,974.00	10,429.00	0.00	10,429.00
Idaho	1	0.53	0.00	0.00	0.00	52.09	0.00	52.62	0.00	52.62
Illinois	7	75.16	0.00	0.00	0.00	0.00	0.00	75.16	2,766.42	2,841.58
Indiana	1	2.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00
Iowa	6	1,335.00	0.00	0.00	0.00	0.00	0.00	1,335.00	0.00	1,335.00
Kansas	2	780.00	0.00	0.00	0.00	0.00	8,800.00	9,580.00	0.40	9,580.40
Kentucky	7	2.67	0.00	0.00	0.00	0.00	0.00	2.67	20.39	23.06
Louisiana	3	1.00	0.00	115.00	0.00	6.00	0.00	122.00	0.00	122.00
Michigan	6	44.00	0.00	0.00	0.00	2,009.00	0.00	2,053.00	1,059.00	3,112.00
Mississippi	2	1,050.00	0.00	0.00	0.00	0.00	0.00	1,050.00	0.00	1,050.00
Missouri	4	68.03	24.00	0.00	0.00	0.00	1.00	93.03	48.00	141.03
Nebraska	6	3.00	0.00	0.00	0.00	0.00	0.00	3.00	64.00	67.00
Nevada	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
New Jersey	10	24.70	252.10	0.00	0.00	621.00	0.00	897.80	25.80	923.60
New York	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
North Dakota	1	0.00	0.00	0.00	0.00	0.00	194.70	194.70	0.00	194.70
Ohio	18	1,388.70	0.00	0.00	0.00	0.00	0.00	1,388.70	5,685.38	7,074.08
Oklahoma	3	0.00	0.00	0.00	0.00	3,090.00	0.00	3,090.00	0.00	3,090.00
Oregon	4	0.00	0.00	0.00	0.00	801.78	0.00	801.78	0.00	801.78
Pennsylvania	4	0.10	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10
Texas	11	1.00	6.19	0.14	0.00	0.00	1.00	8.33	0.60	8.93
Utah	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	1.11
Total	**130**	**6,559.55**	**282.29**	**115.14**	**0.00**	**15,182.57**	**38,277.70**	**60,417.25**	**50,845.10**	**111,262.34**

Note: On-site Releases are from Section 5 of Form R. Off-site Releases are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Map 3-6: Total On- and Off-site Releases, 2001: Pesticides



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

total). Illinois was third with 553,912 pounds or 20.8 percent of the total.

Each of these three states reported most of the quantity of these chemicals in production-related waste as treated on-site. Texas, with the largest total waste and treatment on-site, reported 681,442 pounds treated on-site, which was almost all of the quantity of these chemicals in production-related waste for the state and 28.3 percent of all of the eight pesticides in waste treated on-site in 2001. Ohio's treatment on-site totaled 630,115 pounds or 96.2 percent of the state's total and 26.1 percent of the quantity treated on-site reported by all the states. Illinois reported 551,070 pounds treated on-site, almost 99.5 percent of the state's total.

The state with the largest quantity released on- and off-site was Florida, with 62,875 pounds or 54.4 percent of the total released on- and off-site for all states in 2001.

TRI Data by Industry

On- and Off-site Releases

Only seven industry sectors reported releases of this group of pesticides in 2001. The chemical manufacturing industry reported the largest total releases of any industry sector, 61,546 pounds or 55.3 percent of the total releases (see Table 3-82).

The chemical manufacturing industry also reported the largest amounts of off-site releases (transfers to disposal), with 45,662 pounds representing 89.8 percent of the total off-site releases, and the largest amount of air emissions, with 4,318 pounds or 65.8 percent of the total air emissions.

Table 3-81: Quantities of TRI Chemicals in Waste, by State, 2001: Pesticides

State	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
	On-site	Off-site	On-site	Off-site	On-site	Off-site			
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	0.00	0.00	0.00	0.00	0.00	3.00	2,662.00	2,665.00	0.00
Arkansas	0.00	0.00	330.00	2,642.00	289,124.00	988.00	24.10	293,108.10	0.00
California	2,000.00	0.00	0.00	0.00	0.00	0.20	5,109.80	7,110.00	679.00
Florida	2,000.00	0.00	0.00	0.00	0.00	0.00	62,875.00	64,875.00	0.00
Georgia	0.00	0.00	0.00	0.00	0.00	7,610.00	2,455.00	10,065.00	0.00
Idaho	0.00	0.00	0.00	0.00	0.00	0.00	52.09	52.09	0.00
Illinois	0.00	0.00	0.00	0.00	551,070.00	0.00	2,841.86	553,911.86	0.00
Indiana	0.00	0.00	0.00	0.00	0.00	0.00	11,667.00	11,667.00	0.00
Iowa	0.00	0.00	0.00	0.00	140.00	75,827.00	1,335.00	77,302.00	0.00
Kansas	0.00	0.00	0.00	0.00	0.00	0.40	9,500.00	9,500.40	0.00
Kentucky	0.00	0.00	0.00	0.00	22,529.80	0.00	23.06	22,552.86	0.00
Louisiana	0.00	0.00	0.00	0.00	12.00	38.00	121.00	171.00	0.00
Michigan	0.00	3.00	0.00	7.20	415.00	8.60	3,288.00	3,721.80	0.00
Mississippi	0.00	0.00	0.00	0.00	0.00	80.00	1,050.00	1,130.00	0.00
Missouri	1.00	0.00	0.00	0.00	95,000.00	22,895.00	141.00	118,037.00	0.00
Nebraska	0.00	0.00	0.00	0.00	29,019.00	64.00	3.00	29,086.00	0.00
Nevada	0.00	0.00	0.00	0.00	0.00	103.00	0.00	103.00	0.00
New Jersey	0.00	0.00	0.00	0.00	111,282.10	161.00	923.60	112,366.70	0.00
New York	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
North Dakota	0.00	0.00	0.00	0.00	0.00	0.00	194.70	194.70	0.00
Ohio	9,700.00	0.00	0.00	0.00	630,115.00	7,613.00	7,325.72	654,753.72	0.00
Oklahoma	0.00	0.00	0.00	0.00	0.00	0.00	3,090.00	3,090.00	0.00
Oregon	0.00	0.00	0.00	0.00	3.10	0.00	801.78	804.88	0.00
Pennsylvania	0.00	0.00	1,666.00	0.00	0.00	0.00	0.10	1,666.10	0.00
Texas	1.00	0.00	0.00	0.00	681,442.00	0.00	9.00	681,452.00	0.00
Utah	0.00	0.00	0.00	0.00	445.72	0.00	1.21	446.93	0.02
Total	**13,702.00**	**3.00**	**1,996.00**	**2,649.20**	**2,410,597.72**	**115,391.20**	**115,494.02**	**2,659,833.14**	**679.02**

Note: Data are from Section 8 of Form R.

The food industry had the second largest total releases, with 30,470 pounds of total releases, most of which were other on-site land releases (that is, other than RCRA subtitle C landfills). These releases by the food industry were 77.6 percent of all other on-site land releases of this group of pesticides in 2001.

The hazardous waste/solvent recovery industry reported the third largest amount of total releases, with 17,440 pounds. This industry had the largest amount of on-site releases to RCRA subtitle C landfills, with 12,287 pounds or 80.9 percent of the total releases in this category for 2001.

Waste Management

The hazardous waste/solvent recovery industry reported the largest amount of these pesticides in production-related waste in 2001 (see Table 3-83). With 2.35 million pounds of these chemicals in pro-

Table 3-82: TRI On-site and Off-site Releases, by Industry, 2001: Pesticides

SIC Code	Industry	Total Forms	On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
			Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
12	Coal Mining	1	0.00	0.00	0.00	0.00	0.00	194.70	194.70	0.00	194.70
20	Food	4	781.00	0.00	0.00	0.00	0.00	29,689.00	30,470.00	0.00	30,470.00
28	Chemicals	29	4,318.03	276.00	0.00	0.00	2,896.00	8,394.00	15,884.03	45,662.40	61,546.43
30	Plastics	1	180.00	0.00	0.00	0.00	0.00	0.00	180.00	321.00	501.00
32	Stone/Clay/Glass	4	0.10	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10
39	Miscellaneous	1	1,110.00	0.00	0.00	0.00	0.00	0.00	1,110.00	0.00	1,110.00
7389/4953	Hazardous Waste/Solvent Recovery	90	170.42	6.29	115.14	0.00	12,286.57	0.00	12,578.42	4,861.70	17,440.11
	Total	**130**	**6,559.55**	**282.29**	**115.14**	**0.00**	**15,182.57**	**38,277.70**	**60,417.25**	**50,845.10**	**111,262.34**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Table 3-83: Quantities of TRI Chemicals in Waste, by Industry, 2001: Pesticides

SIC Code	Industry	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
12	Coal Mining	0.00	0.00	0.00	0.00	0.00	0.00	194.70	194.70	0.00
20	Food	0.00	0.00	0.00	0.00	86.00	10.00	30,399.00	30,495.00	0.00
28	Chemicals	8,002.00	0.00	0.00	0.00	95,615.00	113,857.40	53,830.00	271,304.40	679.00
30	Plastics	0.00	0.00	0.00	0.00	0.00	0.00	501.00	501.00	0.00
32	Stone/Clay/Glass	0.00	0.00	1,666.00	0.00	0.00	0.00	0.10	1,666.10	0.00
39	Miscellaneous	5,700.00	0.00	0.00	0.00	0.00	0.00	1,100.00	6,800.00	0.00
7389/4953	Hazardous Waste/Solvent Recovery	0.00	3.00	330.00	2,649.20	2,314,896.72	1,523.80	29,469.22	2,348,871.94	0.02
	Total	**13,702.00**	**3.00**	**1,996.00**	**2,649.20**	**2,410,597.72**	**115,391.20**	**115,494.02**	**2,659,833.14**	**679.02**

Note: Data are from Section 8 of Form R.

duction-related waste, this industry sector accounted for 88.3 percent of the total for these chemicals. A total of 2.31 million pounds of these pesticides were treated on-site by the hazardous waste/solvent recovery industries, representing 98.6 percent of this industry's total for these chemicals in waste.

The chemical manufacturing industry reported the second largest amount of this group of pesticides in production-related waste, with a total of 271,304 pounds. This was 10.2 percent of total production-related waste of these pesticides in 2001. The chemical industry's amount treated off-site (113,857 pounds) represented 98.7 percent of the total amount of these pesticides treated off-site in 2001.

Projected Quantities of TRI Chemicals Managed in Waste, 2001-2003

TRI facilities expected to decrease the quantity of this group of pesticides in production-related waste between 2001 and 2002 by 8.6 percent, from 2.7 million pounds to 2.4 million pounds, with an increase of 0.8 percent to 2.5 million pounds by 2003 (see Table 3-84). This would add up to an overall decrease of 7.8 percent from 2001 to 2003.

The decrease was projected to occur in amounts treated on- and off-site. Treatment on-site was projected to decrease by 5.4 percent from 2001 to 2003 and treatment off-site by 61.8 percent. The quantity released on- and off-site was projected to decrease by 4.3 percent from 2001 to 2003. On- and off-site

Table 3-84: Prior Year, Current Year and Projected Quantities of TRI Chemicals in Waste, 2000-2003: Pesticides

Waste Management Activity	Prior Year 2000		Current Year 2001		Projected 2002		Projected 2003	
	Total Pounds	Percent of Total	Total Pounds	Percent of Total	Total Pounds	Percent of Total	Total Pounds	Percent of Total
Recycled On-site	13,501.00	0.5	13,702.00	0.5	13,702.00	0.6	13,702.00	0.6
Recycled Off-site	0.00	0.0	3.00	0.0	0.00	0.0	0.00	0.0
Energy Recovery On-site	1,569.00	0.1	1,996.00	0.1	2,045.00	0.1	2,096.00	0.1
Energy Recovery Off-site	983.00	0.0	2,649.20	0.1	2,026.00	0.1	2,026.00	0.1
Treated On-site	2,333,821.97	91.8	2,410,597.72	90.6	2,257,396.77	92.8	2,279,300.30	93.0
Treated Off-site	110,506.14	4.3	115,391.20	4.3	46,103.10	1.9	44,029.15	1.8
Quantity Released On- and Off-site	82,422.90	3.2	115,494.02	4.3	111,046.87	4.6	110,552.82	4.5
Total Production-related Waste Managed	**2,542,804.01**	**100.0**	**2,659,833.14**	**100.0**	**2,432,319.74**	**100.0**	**2,451,706.27**	**100.0**
Waste Management Activity	**Change 2000-2001** Percent		**Projected Change 2001-2002** Percent		**Projected Change 2002-2003** Percent		**Projected Change 2001-2003** Percent	
Recycled On-site	1.5		0.0		0.0		0.0	
Recycled Off-site	--		-100.0		--		-100.0	
Energy Recovery On-site	27.2		2.5		2.5		5.0	
Energy Recovery Off-site	169.5		-23.5		0.0		-23.5	
Treated On-site	3.3		-6.4		1.0		-5.4	
Treated Off-site	4.4		-60.0		-4.5		-61.8	
Quantity Released On- and Off-site	40.1		-3.9		-0.4		-4.3	
Total Production-related Waste Managed	**4.6**		**-8.6**		**0.8**		**-7.8**	

Note: Data from Section 8 of Form R for 2001.

Table 3-85: Number of Forms Reporting Source Reduction Activity, by Category, 2001: Pesticides

CAS Number	Chemical	Total Form Rs	Forms Reporting Source Reduction Activity		Category of Source Reduction Activity							
				Percent of All Form Rs	Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Materials Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
		Number	Number	Percent	Number	Number	Number	Number	Number	Number	Number	Number
309-00-2	Aldrin	8	1	12.5	1	0	0	0	0	0	0	0
57-74-9	Chlordane	20	2	10.0	2	0	0	0	0	0	0	0
76-44-8	Heptachlor	15	2	13.3	2	0	0	0	0	0	0	0
465-73-6	Isodrin	5	1	20.0	1	0	0	0	0	0	0	0
72-43-5	Methoxychlor	15	3	20.0	3	0	0	0	0	0	0	0
40487-42-1	Pendimethalin	18	5	27.8	5	0	0	0	0	0	0	0
8001-35-2	Toxaphene	18	5	27.8	3	0	1	0	1	0	0	0
1582-09-8	Trifluralin	31	9	29.0	7	1	1	0	0	0	0	0
	Total	**130**	**28**	**21.5**	**24**	**1**	**2**	**0**	**1**	**0**	**0**	**0**

Note: All source reduction activities on a form are counted in the corresponding category. Totals do not equal the sum of the categories because forms may report more than one source reduction activity.

releases are the least-desirable outcome under the waste management hierarchy described in **Waste Management** in Chapter 1 (Figure 1-2).

The actual change from the prior reporting year of 2000 to 2001 was an increase of 4.6 percent, from 2.5 million pounds to 2.7 million pounds.

Source Reduction

In 2001, 28 forms were filed reporting source reduction activities for this group of pesticides (see Table 3-85). As noted in **Waste Management** in Chapter 1, source reduction—an activity that prevents the generation of waste—is preferred to waste management. These 28 forms represented 21.5 percent of all forms submitted for these pesticides in 2001.

Good operating practices was the type of source reduction used for the majority of forms (24 out of 28).

On- and Off-site Releases, 2000-2001

On- and off-site releases of this group of pesticides increased from 81,730 pounds to 111,262 pounds from 2000 to 2001, an increase of 36.1 percent (see Table 3-86). This was due to an increase in off-site releases (transfers to disposal), which increased by 38,184 pounds or over 300 percent. On-site releases decreased, by 8,652 pounds or 12.5 percent.

The increase in off-site releases (transfers to disposal) of this group of pesticides was primarily due to the increase in transfers to waste brokers for disposal. Such transfers increased by 37,265 pounds. Transfers to landfills/surface impoundments also increased, by 1,918 pounds. On the other hand, transfers to storage only decreased by 2,130 pounds.

The decreases in on-site releases of this group of pesticides was primarily due to decreases in on-site releases to RCRA subtitle C landfills, which decreased by 18,525 pounds or 55.0 percent. Except for surface water discharges, other types of on-site releases increased from 2000 to 2001. Releases to other on-site landfills (that is, other than RCRA subtitle C landfills) increased by 9,780 pounds or 34.3 percent. Air emissions and underground injection also showed small increases.

Waste Management Data, 2000-2001

Quantities of TRI Chemicals in Waste, 2000-2001

The quantity of these pesticides in production-related waste increased from 2.6 million pounds in 2000 to 2.7 million pounds in 2001, an increase of 4.2 percent (see Table 3-87). The amount treated on-site increased by 97,858 pounds or 4.2 percent. The quantity released on- and off-site increased by 28,196 pounds or 32.3 percent.

Table 3-86: TRI On-site and Off-site Releases, 2000-2001: Pesticides

	2000 Number	2001 Number	Change 2000-2001 Number	Change 2000-2001 Percent
Forms	7,092	7,233	141	2.0
On-site Releases	**Pounds**	**Pounds**	**Pounds**	**Percent**
Total Air Emissions	6,529.64	6,559.55	29.91	0.5
Surface Water Discharges	330.62	282.29	-48.33	-14.6
Underground Injection	3.16	115.14	111.97	3,542.4
Class I Wells	3.16	115.14	111.97	3,542.4
Class II-V Wells	0.00	0.00	0.00	--
On-site Land Releases	62,205.32	53,460.27	-8,745.05	-14.1
RCRA Subtitle C Landfills	33,707.32	15,182.57	-18,524.75	-55.0
Other On-site Land Releases	28,498.00	38,277.70	9,779.70	34.3
Total On-site Releases	**69,068.74**	**60,417.25**	**-8,651.50**	**-12.5**
Off-site Releases				
Storage Only*	5,613.00	3,483.00	-2,130.00	-37.9
Solidification/Stabilization**	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Wastewater Treatment (Excluding POTWs)***	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Transfers to POTWs****	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Underground Injection	0.00	0.00	0.00	--
Landfills/Surface Impoundments	1,865.87	3,783.72	1,917.85	102.8
Land Treatment	0.00	0.00	0.00	--
Other Land Disposal	41.00	0.00	-41.00	-100.0
Other Off-site Management	0.00	0.00	0.00	--
Transfers to Waste Broker for Disposal	4,905.10	42,170.00	37,264.90	759.7
Unknown*****	236.63	1,408.38	1,171.75	495.2
Total Off-site Releases (Transfers Off-site to Disposal)	**12,661.60**	**50,845.10**	**38,183.50**	**301.6**
Total On- and Off-site Releases	**81,730.34**	**111,262.34**	**29,532.00**	**36.1**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

* Storage only (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to storage only are included as a form of disposal (off-site release). See Box 1-5.

** Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal cateogry compounds (waste treatment code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste treatment code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 1-6. Reports under code M40 of metals and metal category compounds have been included in solidification/stabilization of metals and metal cateogry compounds in this report.

*** Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal category compounds (waste treatment code M61) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste treatment code M60). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 1-6. Transfers of metals and metal category compounds reported under code M60 have been included in transfers of metals and metal category compounds to wastewater treatment.

**** Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal category compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

***** Unknown (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as unknown transfers are treated as a form of disposal (off-site release).

Table 3-87: Quantities of TRI Chemicals in Waste by Waste Management Activity, 2000-2001: Pesticides

Waste Management Activity	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Recycled On-site	11,501.00	13,702.00	2,201.00	19.1
Recycled Off-site	0.00	3.00	3.00	--
Energy Recovery On-site	1,569.00	1,996.00	427.00	27.2
Energy Recovery Off-site	983.00	2,649.20	1,666.20	169.5
Treated On-site	2,312,740.17	2,410,597.72	97,857.55	4.2
Treated Off-site	139,269.19	115,391.20	-23,877.99	-17.1
Quantity Released On- and Off-site	87,297.74	115,494.02	28,196.28	32.3
Total Production-related Waste Managed	**2,553,360.10**	**2,659,833.14**	**106,473.04**	**4.2**
Non-production-related Waste Managed	45.00	679.02	634.02	1,408.9

Note: Data are from Section 8 of Form R of year indicated.

Table 3-88: TRI Transfers Off-site for Further Waste Management, including Disposal, 2000-2001: Pesticides

	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Transfers to Recycling	0.00	179.00	179.00	--
Transfers to Energy Recovery	1,003.00	2,648.15	1,645.15	164.0
Transfers to Treatment	126,726.55	127,370.82	644.27	0.5
Transfers to POTWs	13.00	11.00	-2.00	-15.4
Metals and Metal Category Compounds Only	0.00	0.00	0.00	--
Non-metal TRI Chemicals	13.00	11.00	-2.00	-15.4
Other Off-site Transfers*	0.00	0.00	0.00	--
Other Off-site Transfers to Disposal**	12,831.60	51,759.94	38,928.34	303.4
Total Transfers for Further Waste Management, including Disposal	**140,574.15**	**181,968.91**	**41,394.76**	**29.4**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

The only type of waste management activity that decreased from 2000 to 2001 was treatment off-site. The amount of this group of pesticides in waste treated off-site decreased by 23,878 pounds or 17.1 percent.

Transfers Off-site for Further Waste Management, including Disposal, 2000-2001

As shown in Table 3-88, transfers off-site for further waste management, including disposal, of this group of pesticides increased from 2000 to 2001, by 41,395 pounds or 29.4 percent. Other off-site transfers to disposal increased by 38,928 pounds or over 300 percent. This group of pesticides in waste sent for energy recovery also increased, by 1,645 pounds or 164.0 percent.

The only type of transfers showing a decrease was transfers to POTWs, which decreased by 2 pounds or 15.4 percent.

Other PBT Chemicals

INTRODUCTION

There are four other PBT chemicals, hexachlorobenzene, octachlorostyrene, pentachlorbenzene, and tetrabromobisphenol A that are covered in this section.

Hexachlorobenzene, also known as HCB; HEXA C.B.; phenyl perchloryl; and perchlorobenzene, is an organo-chlorine compound. It is a white crystalline solid created by the chlorination of benzene. Hexachlorobenzene was once used as an agricultural fungicide, but health concerns about its toxicity led to the cancellation of the registrations of all pesticides that contained hexachlorobenzene as an active ingredient. Its primary use was to treat wheat seeds, onions, and sorghum. As late as 1985 it was used to prevent wheat smut. Although no longer used as an active ingredient in pesticides, hexachlorobenzene is a byproduct impurity contained in the pesticides ametryn, atrazine, cyanazine, dacthal, dienochlor, dipropetryn, lindane, maleic hydrazide, mirex, pentachloronitrobenzine, picloram, prometon, prometryn, propazine, simazine, and terbutryn.

Octachlorostyrene is a polychlorinated styrene that is an unwanted byproduct of chlorine production, chlorination reactions, and metal product/finishing operations such as the production of metallic magnesium and dry etching of aluminum. Octachlorostyrene may also be formed by the high-temperature incineration of chlorinated hydrocarbons. It is not a commercial product, and no commercial uses are known.

Pentachlorobenzene is formed by the chlorination of benzene. Pentachlorobenzene is not used as an end product. It is made as an intermediate in the production of the fungicide pentachloronitrobenzene (quintozene) and is an impurity remaining in the end product. Quintozene has been commercially produced since the 1930s and is also referred to as PCNB and PkhNB. It has also been marketed under the following trade names: Avicol, Earthcide, Folosan, Kobu, Kobutol, Pentagen, RTU, PCNB, Terrachlor, Terrazan and Tri-PCNB. It is a white or colorless crystalline solid with a characteristic pleasant odor.

Tetrabromobisphenol A, otherwise known as TBBPA, is a white, crystalline powder that is soluble in methanol and ether. TBBPA is a brominated flame retardant and is often used in plastics and engineering resins for printed circuit boards and computer equipment.

More details on these four chemicals, their sources, chemical characteristics, health and environmental effects and efforts being undertaken to reduce pollution from the chemicals can be found in the *2000 Toxics Release Inventory Public Data Release Report* (EPA 260-R-02-003).

2001 TRI DATA FOR OTHER PBT CHEMICALS

On-site and Off-site Releases, 2001

As shown in Table 3-89, there were 168 TRI forms submitted for 2001 for the PBT chemicals: hexachlorobenzene, octachlorostyrene, pentachlorobenzene and tetrabromobisphenol A. On- and off-site releases for these PBT chemicals totaled 915,807 pounds. Tetrabromobisphenol A had the largest releases of this group, with 876,171 pounds or 95.7 percent of the total releases for these PBT chemicals. Releases of hexachlorobenzene, the chemical with the most number of forms and the second largest releases of these PBT chemicals, were 36,175 pounds (4.0 percent of the total). Pentachlorobenzene followed with 2,760 pounds and octachlorostyrene had 702 pounds.

Off-site releases (transfers to disposal) were the largest type of release for these PBT chemicals, accounting for 69.6 percent of total releases, or 637,304 pounds (see Figure 3-19). Other on-site

Table 3-89: TRI On-site and Off-site Releases, 2001: Other PBTs

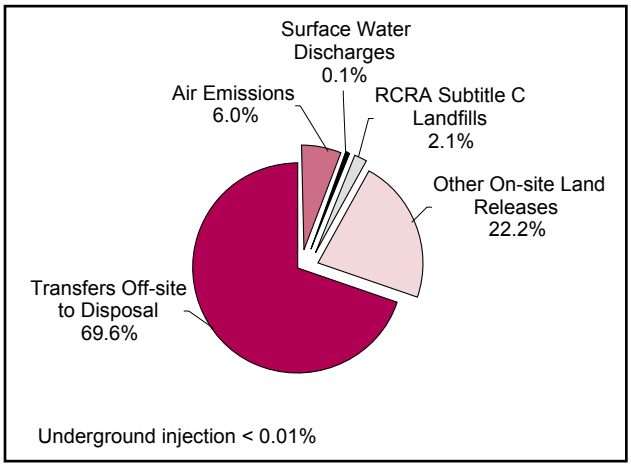
CAS Number	Chemical	Total Forms	On-site Releases							Off-site Releases	Total On- and Off-site Releases
					Underground Injection		On-site Land Releases				
			Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
118-74-1	Hexachlorobenzene	99	1,199.39	321.61	22.00	0.02	18,586.97	4,937.60	25,067.59	11,107.40	36,174.98
29082-74-4	Octachlorostyrene	4	0.00	0.12	0.00	0.00	0.00	193.00	193.12	508.60	701.72
608-93-5	Pentachlorobenzene	17	69.10	132.70	1.48	0.00	420.00	1,929.90	2,553.18	206.32	2,759.50
79-94-7	Tetrabromobisphenol A	48	54,004.91	9.00	0.00	0.00	0.00	196,675.00	250,688.91	625,481.75	876,170.66
	Total	**168**	**55,273.40**	**463.43**	**23.48**	**0.02**	**19,006.97**	**203,735.50**	**278,502.80**	**637,304.07**	**915,806.87**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

land releases (that is, other than RCRA subtitle C landfills) were the second largest type of release, accounting for 22.2 percent of total releases or 203,736 pounds. (Types of on-site land releases are described in Box 1-4 in Chapter 1.) Air emissions totaled 55,273 pounds or 6.0 percent of total releases for these PBT chemicals. Releases to RCRA subtitle C landfills totaled 19,007 pounds. Surface water discharges and underground injection of these PBT chemicals totaled 487 pounds.

For tetrabromobisphenol A, off-site releases were 625,482 pounds representing 71.4 percent of the total releases for this chemical. Another 196,675 pounds or 22.4 percent were other on-site land releases (that is, other than RCRA subtitle C landfills) and 54,005 pounds or 6.2 percent were air emissions.

Figure 3-19: Distribution of TRI On-site and Off-site Releases, 2001: Other PBTs



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Hexachlorobenzene's releases of 36,175 pounds were divided between 18,587 pounds of on-site land releases to RCRA subtitle C landfills (51.4 percent of the total releases for the chemical), 11,107 pounds of off-site releases (transfers to disposal) (30.7 percent of this chemical's total releases total), and 4,938 pounds of other on-site land releases (13.6 percent of the total releases for the chemical).

Pentachlorobenzene's releases were primarily other on-site land releases (that is, other than RCRA subtitle C landfills), with 1,930 pounds representing 69.9 percent of the chemical's total releases, 420 pounds to RCRA subtitle C landfills (15.2 percent of the chemical's total releases), and 206 pounds of off-site releases (transfers to disposal) (7.5 percent of the chemical's total releases).

Almost three-quarters (509 pounds out of 702 pounds) of the total releases of octachlorostyrene were off-site releases (transfers to disposal). Octachlorostyrene also had 193 pounds in other on-site land releases (that is, other than RCRA subtitle C landfills).

Waste Management Data, 2001

Quantities of TRI Chemicals in Waste

As shown in Table 3-90, there were 8.2 million pounds of these chemicals in production-related waste in 2001. Much (6.8 million pounds or 83.1

Table 3-90: Quantities of TRI Chemicals in Waste, 2001: Other PBTs

CAS Number	Chemical	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
118-74-1	Hexachlorobenzene	5,400.10	1,432.00	369,749.64	2,132.80	6,269,768.60	41,542.86	48,534.45	6,738,560.45	9,310.49
29082-74-4	Octachlorostyrene	0.00	0.00	0.00	0.00	8.00	0.00	701.72	709.72	0.00
608-93-5	Pentachlorobenzene	8.00	770.00	330.00	1,491.00	445,846.25	1,307.52	2,759.93	452,512.70	3,073.84
79-94-7	Tetrabromobisphenol A	556.00	323.00	0.00	2,927.50	94,850.00	52,090.00	854,019.81	1,004,766.31	0.00
	Total	**5,964.10**	**2,525.00**	**370,079.64**	**6,551.30**	**6,810,472.85**	**94,940.38**	**906,015.92**	**8,196,549.19**	**12,384.33**

Note: Data are from Section 8 of Form R.

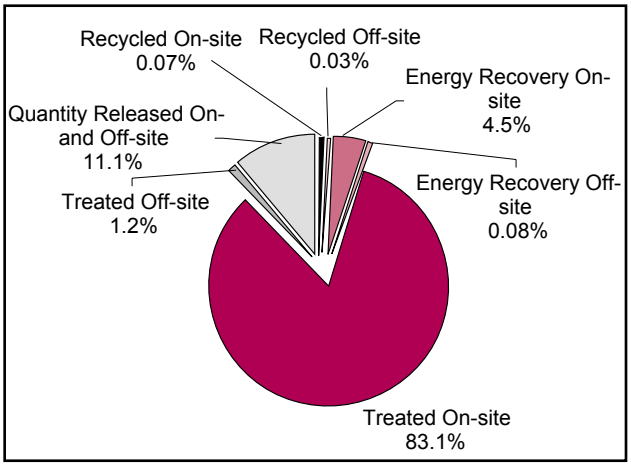
percent) of this was treated on-site (see Figure 3-20). Another 11.1 percent (906,016 pounds) was released on- and off-site site.

Hexachlorobenzene accounted for 6.7 million pounds or 82.2 percent of the quantity of these PBT chemicals. Most was treated on-site. The 6.3 million pounds of hexachlorobenzene treated on-site represented 93.0 percent of the total quantity of hexachlorobenzene in production-related waste in 2001.

There were 1.0 million pounds of tetrabromobisphenol A in production-related waste reported for 2001. A total of 85.0 percent (854,020 pounds) of this was released on- and off-site.

There were 452,513 pounds of pentachlorobenzene in production-related waste, with 445,846 pounds treated on-site. On-site treatment accounted for 98.5 percent of the total in 2001.

Figure 3-20: Distribution of Quantities of TRI Chemicals in Waste, 2001: Other PBTs



Note: Data are from Section 8 of Form R.

There were 710 pounds of octachlorostyrene in production-related waste reported for 2001. Almost all (702 pounds) of it was released on- and off-site.

Transfers Off-site for Further Waste Management, including Disposal

Transfers off-site for further waste management, including disposal, of these PBT chemicals totaled 735,174 pounds in 2001 (see Table 3-91). Other off-site transfers to disposal accounted for 87.6 percent of the transfers for further waste management, including disposal (see Figure 3-21). Transfers to treatment accounted for 11.2 percent.

Transfers off-site for further waste management, including disposal, of tetrabromobisphenol A totaled 672,781 pounds for 2001, 93.0 percent of which was off-site transfers to disposal.

For hexachlorobenzene, transfers off-site for further waste management, including disposal, were 55,036 pounds. Such transfers consisted of 33,377 pounds (60.6 percent) of transfers to treatment, 18,073 pounds (32.8 percent) of other transfers to disposal, and smaller amounts of transfers to energy recovery and recycling.

Transfers off-site for further waste management, including disposal, of pentachlorobenzene totaled 6,849 pounds with 64.0 percent as transfers to treatment and 21.8 percent as transfers to energy recovery.

The 509 pounds of transfers off-site for further waste management, including disposal, of octachlorostyrene were all other transfers to disposal.

Table 3-91: TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Other PBTs

CAS Number	Chemical	Transfers to Recycling Pounds	Transfers to Energy Recovery Pounds	Transfers to Treatment Pounds	Transfers to POTWs: Metals and Metal Category Compounds Pounds	Transfers to POTWs: Non-metal TRI Chemicals Pounds	Other Off-site Transfers* Pounds	Other Off-site Transfers to Disposal** Pounds	Total Transfers for Further Waste Management, including Disposal Pounds
118-74-1	Hexachlorobenzene	1,432.02	2,132.80	33,376.71	0.00	20.90	0.10	18,073.14	55,035.66
29082-74-4	Octachlorostyrene	0.00	0.00	0.00	0.00	0.00	0.00	508.60	508.60
608-93-5	Pentachlorobenzene	770.00	1,491.00	4,381.36	0.00	0.00	0.00	206.32	6,848.68
79-94-7	Tetrabromobisphenol A	12.00	2,979.20	44,299.30	0.00	9.00	0.00	625,481.75	672,781.25
	Total	**2,214.02**	**6,603.00**	**82,057.37**	**0.00**	**29.90**	**0.10**	**644,269.81**	**735,174.19**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

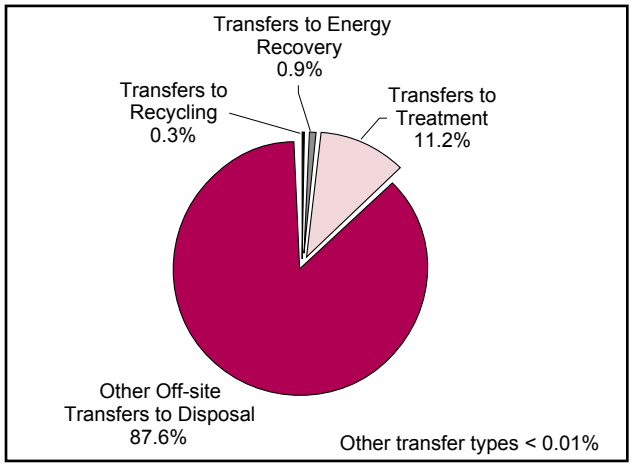
TRI Data by State

Facilities in Texas submitted the largest number of forms, 15, in 2001 for these PBT chemicals. Louisiana submitted the second largest number of forms, with 13, and California was third with 10.

On- and Off-site Releases

In 2001, facilities in Arkansas reported the largest total on- and off-site releases of these PBT chemicals (see Table 3-92). They reported a total of 841,490 pounds, or 91.9 percent of the total for 2001, of which all but 5 pounds was tetrabisphenol A. South Carolina reported the second largest amount with 13,952 pounds, which was 1.5 percent of the total.

Figure 3-21: Distribution of TRI Transfers Off-site for Further Waste Management, including Disposal, 2001: Other PBTs



Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.

Arkansas' releases consisted of off-site releases (transfers to disposal), other on-site land releases (that is, other than RCRA subtitle C landfills), and air emissions. Off-site releases from Arkansas facilities represented 71.3 percent (600,030 pounds) of total releases in Arkansas, other on-site land releases were 22.6 percent (190,000 pounds), and air emissions were 6.1 percent (51,460 pounds).

South Carolina facilities reported 13,952 pounds of total releases, of which 56.7 percent were off-site releases (transfers to disposal) and 43.3 percent were other on-site land releases (land releases to other than RCRA subtitle C landfills).

As shown in Map 3-7, releases of these PBT chemicals were concentrated in Arkansas with 841,490 pounds. Fourteen other states reported between 1,000 and 15,000 pounds of total releases.

Waste Management Data

The states with the largest quantity of these PBT chemicals in production-related waste in 2001 were Louisiana and Texas (see Table 3-93). Louisiana reported 3.6 million pounds and accounted for 44.0 percent of the total for these PBT chemicals. Texas reported 3.2 million pounds and accounted for 39.3 percent of the total. Arkansas ranked third with 898,123 pounds (11.0 percent of the total).

Both Louisiana and Texas reported most of these PBT chemicals in production-related waste as treated on-site. Over 3.2 million pounds (90.0 percent) of these chemicals in production-related waste in

Table 3-92: TRI On-site and Off-site Releases, by State, 2001: Other PBTs

State	Total Forms	On-site Releases							Off-site Releases	Total On- and Off-site Releases
				Underground Injection		On-site Land Releases				
		Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	
	Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Alabama	9	1,185.00	0.00	0.00	0.00	900.00	0.00	2,085.00	0.00	2,085.00
Arizona	3	2.21	0.00	0.00	0.00	0.00	0.00	2.21	215.50	217.71
Arkansas	6	51,460.02	0.00	0.00	0.00	0.00	190,000.00	241,460.02	600,030.00	841,490.02
California	10	7.73	0.03	0.00	0.00	457.00	0.00	464.76	7,790.78	8,255.53
Colorado	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Connecticut	2	5.80	0.00	0.00	0.00	0.00	0.00	5.80	254.00	259.80
Delaware	4	0.00	67.82	0.00	0.00	0.00	170.60	238.42	1,382.20	1,620.62
Florida	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Georgia	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Illinois	7	239.27	1.00	0.00	0.00	0.00	0.00	240.27	12.25	252.52
Indiana	4	9.55	8.00	0.00	0.00	0.00	0.00	17.55	88.00	105.55
Iowa	2	11.80	0.00	0.00	0.00	0.00	0.00	11.80	0.00	11.80
Kansas	3	0.00	0.00	20.00	0.00	0.00	0.00	20.00	188.25	208.25
Kentucky	3	0.21	9.00	0.00	0.00	0.00	0.00	9.21	0.00	9.21
Louisiana	13	614.73	14.00	0.00	0.00	7,500.00	0.00	8,128.73	0.60	8,129.33
Maryland	2	0.00	0.10	0.00	0.00	0.00	27.50	27.60	0.00	27.60
Massachusetts	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	109.00	109.00
Michigan	6	124.51	0.00	0.00	0.00	4,189.00	0.00	4,313.51	2,467.00	6,780.51
Minnesota	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mississippi	6	1.40	0.00	0.00	0.00	0.00	4,008.40	4,009.80	0.00	4,009.80
Missouri	2	20.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00	20.00
Montana	1	11.70	0.00	0.00	0.00	0.00	0.00	11.70	0.00	11.70
Nebraska	1	4.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00	4.00
Nevada	1	0.00	0.00	0.00	0.00	5,492.00	0.00	5,492.00	0.00	5,492.00
New Hampshire	2	2.20	0.00	0.00	0.00	0.00	0.00	2.20	0.00	2.20
New Jersey	5	98.40	48.00	0.00	0.00	291.00	0.00	437.40	74.60	512.00
New York	5	35.56	0.30	0.00	0.00	0.00	0.00	35.86	7,309.30	7,345.16
North Carolina	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10
Ohio	7	0.46	3.68	0.00	0.00	0.00	0.00	4.14	828.67	832.81
Oklahoma	1	62.00	0.00	0.00	0.00	0.00	0.00	62.00	0.00	62.00
Oregon	4	0.00	0.00	0.00	0.00	166.97	0.00	166.97	23.65	190.62
Pennsylvania	4	269.00	0.00	0.00	0.00	0.00	0.00	269.00	156.00	425.00
South Carolina	4	0.00	0.00	0.00	0.00	0.00	6,040.00	6,040.00	7,912.00	13,952.00
Tennessee	8	75.21	281.00	0.00	0.00	0.00	2,118.00	2,474.21	272.00	2,746.21
Texas	15	74.64	30.50	3.48	0.02	11.00	0.00	119.63	6,613.00	6,732.63
Utah	5	0.00	0.00	0.00	0.00	0.00	736.00	736.00	269.17	1,005.17
Washington	7	956.00	0.00	0.00	0.00	0.00	0.00	956.00	673.00	1,629.00
West Virginia	2	2.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00
Wisconsin	1	0.00	0.00	0.00	0.00	0.00	635.00	635.00	635.00	1,270.00
Total	**168**	**55,273.40**	**463.43**	**23.48**	**0.02**	**19,006.97**	**203,735.50**	**278,502.80**	**637,304.07**	**915,806.87**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

Louisiana was treated on-site, and almost 3.2 million pounds (97.8 percent) in Texas was also treated on-site. Most of the amount treated on-site in both Louisiana and Texas was hexachlorobenzene.

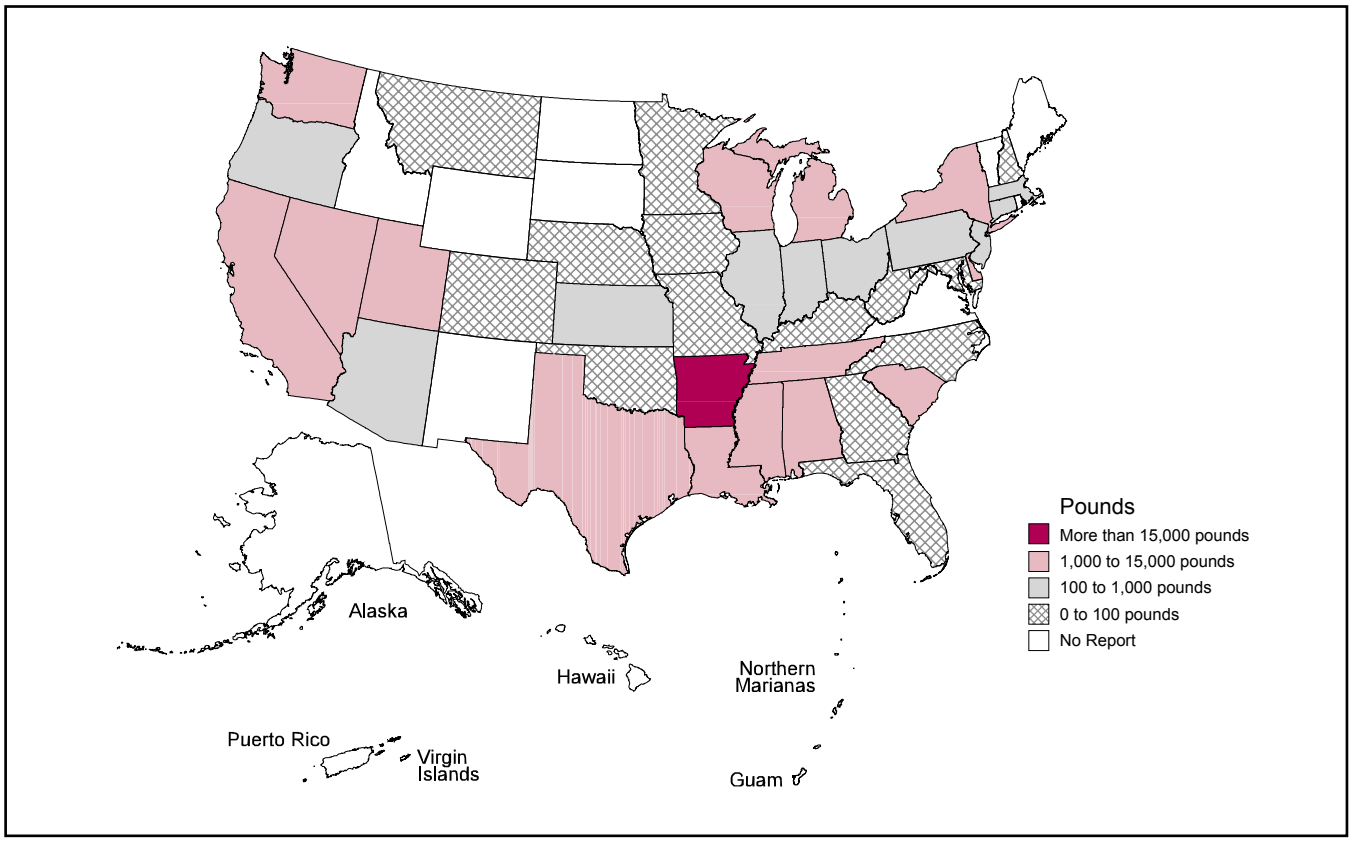
Arkansas reported the largest quantity released on- and off-site, with 833,618 pounds, which was 92.8 percent of these PBT chemicals in production-related waste for Arkansas in 2001.

TRI Data by Industry

On- and Off-site Releases

Only eleven individual industry sectors reported releases of these PBT chemicals in 2001. The chemical manufacturing sector reported the largest total releases of any industry sector, with 859,059 pounds or 93.8 percent of the total releases (see Table 3-94). More than two-thirds (608,280 pounds) of the releases for the chemical industry were off-site releases (transfers to disposal). Almost 22.9 percent (196,325 pounds) of the releases of the chemicals industry were other on-site land releases

Map 3-7: Total On- and Off-site Releases, 2001: Other PBTs



Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

(that is, other than RCRA subtitle C landfills). A total of 53,679 pounds of air emissions of these PBT chemicals were reported by the chemicals industry, accounting for 6.2 percent of total releases for this industry.

The hazardous waste/solvent recovery industries reported the second largest amount of total releases, with 22,559 pounds, and the largest on-site land releases to RCRA subtitle C landfills, with 18,705 pounds. On-site land releases to RCRA subtitle C landfills accounted for 82.9 percent of releases of these PBT chemicals by the hazardous waste/solvent recovery industries in 2001.

The electrical equipment industry had the third largest total releases, with 15,991 pounds of total releases. Off-site releases (transfers to disposal) accounted for 58.2 percent (9,310 pounds) of total releases of the electrical equipment industry. This sector also reported 6,675 pounds of other on-site land releases (that is, other than RCRA subtitle C landfills), representing 41.7 percent of total releases of the electrical equipment industry.

Waste Management

The chemical manufacturing industry reported the largest amount of these PBT chemicals in production-related waste in 2001 (see Table 3-95). With 6.4 million pounds, this industry sector accounted for 78.1 percent of these PBT chemicals in production-related waste. Most of the chemical industry's quantity of these chemicals in production-related waste (79.8 percent or 5.1 million pounds) was treated on-site and 13.5 percent (863,540 pounds) was released on- and off-site.

Table 3-93: Quantities of TRI Chemicals in Waste, by State, 2001: Other PBTs

State	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	On-site Pounds	Off-site Pounds	Pounds	Pounds	Pounds
Alabama	0.00	0.00	0.00	1,257.10	0.10	1,053.00	2,085.00	4,395.20	0.00
Arizona	0.00	0.00	0.00	383.00	0.00	1,700.00	217.71	2,300.71	0.00
Arkansas	0.00	0.00	330.00	1,491.00	60,409.00	2,275.00	833,618.02	898,123.02	0.00
California	5,400.00	516.20	0.00	2,190.00	1,800.00	24,886.00	687.72	35,479.92	0.10
Colorado	0.00	1,680.00	0.00	0.00	0.00	360.00	0.00	2,040.00	0.00
Connecticut	556.00	0.00	0.00	0.00	0.00	80.00	259.00	895.00	0.00
Delaware	0.00	0.00	0.00	0.00	0.00	0.00	1,620.62	1,620.62	0.00
Florida	0.00	0.00	0.00	0.00	0.00	2,816.00	0.00	2,816.00	0.00
Georgia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Illinois	0.00	0.00	0.00	100.00	2,441.00	89.00	252.00	2,882.00	0.00
Indiana	0.00	0.00	16,754.00	40.20	74.00	0.00	105.55	16,973.75	0.00
Iowa	0.00	0.00	0.00	0.00	0.00	0.40	11.80	12.20	0.00
Kansas	0.00	0.00	2,100.00	19.00	0.00	58.00	267.25	2,444.25	0.00
Kentucky	8.00	0.00	0.00	0.00	487.00	0.00	9.21	504.21	0.00
Louisiana	0.10	0.00	350,000.00	0.00	3,242,428.00	2,863.99	8,128.43	3,603,420.52	6,683.23
Maryland	0.00	0.00	0.00	0.00	0.00	0.00	27.60	27.60	0.00
Massachusetts	0.00	0.00	0.00	0.00	0.00	0.00	109.00	109.00	0.00
Michigan	0.00	5.80	0.00	13.40	871.00	16.00	6,780.50	7,686.70	0.00
Minnesota	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.10	0.00
Mississippi	0.00	0.00	0.00	0.00	0.00	0.33	4,009.80	4,010.13	0.00
Missouri	0.00	0.00	0.00	0.00	0.00	460.00	20.00	480.00	0.00
Montana	0.00	0.00	0.00	0.00	0.00	0.00	11.70	11.70	0.00
Nebraska	0.00	0.00	0.00	0.00	38,020.00	0.00	4.00	38,024.00	0.00
Nevada	0.00	0.00	0.00	0.00	0.00	0.00	5,492.00	5,492.00	0.00
New Hampshire	0.00	0.00	0.00	0.00	0.00	405.00	2.20	407.20	0.00
New Jersey	0.00	0.00	0.00	0.00	79,073.70	1,833.50	512.00	81,419.20	0.00
New York	0.00	0.00	0.00	1,054.00	183.00	3.00	7,311.51	8,551.51	5,680.00
North Carolina	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.00
Ohio	0.00	0.00	0.00	0.00	219,025.00	537.00	835.56	220,397.56	0.00
Oklahoma	0.00	0.00	0.00	0.00	0.00	0.00	62.00	62.00	0.00
Oregon	0.00	0.00	0.00	0.00	0.00	17.15	190.62	207.77	0.00
Pennsylvania	0.00	0.00	0.00	0.00	265.00	37.00	425.00	727.00	0.00
South Carolina	0.00	311.00	0.00	3.50	0.00	1.00	7,912.00	8,227.50	0.00
Tennessee	0.00	0.00	116.64	0.00	501.00	2,662.00	2,746.19	6,025.83	0.00
Texas	0.00	0.00	779.00	0.00	3,152,116.00	52,251.01	19,031.65	3,224,177.66	21.00
Utah	0.00	0.00	0.00	0.00	12,779.05	517.00	1,005.17	14,301.22	0.00
Washington	0.00	12.00	0.00	0.00	0.00	0.00	1,629.00	1,641.00	0.00
West Virginia	0.00	0.00	0.00	0.00	0.00	19.00	1.00	20.00	0.00
Wisconsin	0.00	0.00	0.00	0.00	0.00	0.00	635.00	635.00	0.00
Total	**5,964.10**	**2,525.00**	**370,079.64**	**6,551.30**	**6,810,472.85**	**94,940.38**	**906,015.92**	**8,196,549.19**	**12,384.33**

Note: Data are from Section 8 of Form R.

The hazardous waste/solvent recovery industries had the second largest quantity of these chemicals in production-related waste in 2001, with over 1.7 million pounds. Over 98.4 percent (1.7 million pounds) of the hazardous waste/solvent recovery industries' quantity of these chemicals in production-related waste was treated on-site. The quantity released on- and off-site accounted for 1.3 percent (22,564 pounds) of these industries' total.

Three other industry sectors reported more than 10,000 pounds of these PBT chemicals in production-related waste in 2001. The textiles industry had 24,188 pounds, almost all as treatment off-site. The stone/clay/glass sector had 18,915 pounds, primarily burned for energy recovery on-site. The electrical equipment industry had 11,487 pounds, primarily released on- and off-site.

Projected Quantities of TRI Chemicals Managed in Waste, 2001-2003

TRI facilities expected to decrease the quantity of these PBT chemicals in production-related waste between 2001 and 2003 by 1.7 percent, from 8.2 million pounds to 8.1 million pounds (see Table 3-96). The projected decrease was expected to occur from 2001 to 2002, with almost no overall change from 2002 to 2003.

The decrease was projected to occur in treatment on- and off-site, quantity released on- and off-site

Table 3-94: TRI On-site and Off-site Releases, by Industry, 2001: Other PBTs

SIC Code	Industry	Total Forms	On-site Releases							Off-site Releases	
					Underground Injection		On-site Land Releases				
			Total Air Emissions	Surface Water Discharges	Class I Wells	Class II-V Wells	RCRA Subtitle C Landfills	Other On-site Land Releases	Total On-site Releases	Transfers Off-site to Disposal	Total On- and Off-site Releases
		Number	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
22	Textiles	2	2.00	0.00	0.00	0.00	0.00	0.00	2.00	7,698.00	7,700.00
24	Lumber	21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.10
28	Chemicals	64	53,678.91	453.74	20.00	0.02	302.00	196,324.50	250,779.17	608,280.00	859,059.17
30	Plastics	9	351.37	0.00	0.00	0.00	0.00	0.00	351.37	7,428.20	7,779.57
32	Stone/Clay/Glass	2	0.70	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.70
33	Primary Metals	5	4.85	0.00	0.00	0.00	0.00	736.00	740.85	23.65	764.50
36	Electrical Equip.	11	6.72	0.00	0.00	0.00	0.00	6,675.00	6,681.72	9,309.50	15,991.22
37	Transportation Equip.	4	959.00	0.00	0.00	0.00	0.00	0.00	959.00	673.00	1,632.00
--	Multiple codes 20-39	8	2.00	0.00	0.00	0.00	0.00	0.00	2.00	188.25	190.25
--	No codes 20-39	3	11.00	0.00	0.00	0.00	0.00	0.00	11.00	0.00	11.00
491/493	Electric Utilities	10	118.31	0.01	0.00	0.00	0.00	0.00	118.31	0.78	119.09
5169	Chemical Wholesale Distributors	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7389/4953	Hazardous Waste/Solvent Recovery	28	138.54	9.68	3.48	0.00	18,704.97	0.00	18,856.67	3,702.59	22,559.26
	Total	**168**	**55,273.40**	**463.43**	**23.48**	**0.02**	**19,006.97**	**203,735.50**	**278,502.80**	**637,304.07**	**915,806.87**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

and energy recovery off-site. Treatment on-site (the activity with the largest amounts) was projected to decrease by 1.9 percent from 2001 to 2003.

There was a large jump in the actual amounts of these chemicals in production-related waste from the prior year of 2000 to 2001, with a 75.9 increase from 4.7 million pounds to 8.2 million pounds.

Source Reduction

In 2001, 40 forms were filed reporting source reduction activities for these PBT chemicals (see Table 3-97). As noted in **Waste Management** in Chapter 1, source reduction—an activity that prevents the generation of waste—is preferred to waste management. These 40 forms represented 23.8 percent of all forms submitted for these PBT chemicals in 2001.

The most frequently reported source reduction activity for these PBT chemicals was good operating practices, with 16 forms. Other source reduction activities included process modifications (listed on 9 forms), spill and leak prevention (on 5 forms), and raw materials modifications (on 4 forms).

Table 3-95: Quantities of TRI Chemicals in Waste, by Industry, 2001: Other PBTs

SIC Code	Industry	Recycled		Energy Recovery		Treated		Quantity Released On- and Off-site	Total Production-related Waste Managed	Non-production-related Waste Managed
		On-site	Off-site	On-site	Off-site	On-site	Off-site			
		Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
22	Textiles	0.00	0.00	0.00	0.00	0.00	24,186.00	2.00	24,188.00	0.00
24	Lumber	0.10	0.00	0.00	0.20	0.10	1.36	0.10	1.86	0.00
28	Chemicals	5,408.00	1,680.00	350,779.00	3,317.00	5,110,984.00	65,200.90	863,540.05	6,400,908.95	12,384.33
30	Plastics	556.00	0.00	0.00	133.50	0.00	0.00	7,876.50	8,566.00	0.00
32	Stone/Clay/Glass	0.00	0.00	18,854.00	59.20	0.00	0.00	1.70	18,914.90	0.00
33	Primary Metals	0.00	0.00	0.00	0.00	0.00	506.08	764.50	1,270.58	0.00
36	Electrical Equip.	0.00	323.00	0.00	1,437.00	3.00	408.00	9,316.22	11,487.22	0.00
37	Transportation Equip.	0.00	0.00	0.00	0.00	0.00	80.00	1,631.00	1,711.00	0.00
--	Multiple codes 20-39	0.00	0.00	0.00	100.00	0.00	1,700.00	190.25	1,990.25	0.00
--	No codes 20-39	0.00	0.00	0.00	0.00	0.00	28.00	11.00	39.00	0.00
491/493	Electric Utilities	0.00	516.20	0.00	0.00	0.00	0.00	119.08	635.28	0.00
5169	Chemical Wholesale Distributors	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7389/4953	Hazardous Waste/Solvent Recovery	0.00	5.80	446.64	1,504.40	1,699,485.75	2,830.04	22,563.51	1,726,836.14	0.00
	Total	**5,964.10**	**2,525.00**	**370,079.64**	**6,551.30**	**6,810,472.85**	**94,940.38**	**906,015.92**	**8,196,549.19**	**12,384.33**

Note: Data are from Section 8 of Form R.

Table 3-96: Prior Year, Current Year and Projected Quantities of TRI Chemicals in Waste, 2000-2003: Other PBTs

Waste Management Activity	Prior Year 2000		Current Year 2001		Projected 2002		Projected 2003	
	Total Pounds	Percent of Total	Total Pounds	Percent of Total	Total Pounds	Percent of Total	Total Pounds	Percent of Total
Recycled On-site	6,565.50	0.1	5,964.10	0.1	6,561.20	0.1	6,561.20	0.1
Recycled Off-site	12,977.00	0.3	2,525.00	0.0	2,247.00	0.0	3,327.00	0.0
Energy Recovery On-site	129,062.00	2.8	370,079.64	4.5	373,558.30	4.6	372,571.13	4.6
Energy Recovery Off-site	4,861.00	0.1	6,551.30	0.1	6,104.00	0.1	6,104.00	0.1
Treated On-site	3,656,627.27	78.5	6,810,472.85	83.1	6,682,400.15	83.0	6,682,586.15	82.9
Treated Off-site	26,774.64	0.6	94,940.38	1.2	88,732.67	1.1	89,192.68	1.1
Quantity Released On- and Off-site	823,598.74	17.7	906,015.92	11.1	894,892.35	11.1	897,376.43	11.1
Total Production-related Waste Managed	**4,660,466.15**	**100.0**	**8,196,549.19**	**100.0**	**8,054,495.68**	**100.0**	**8,057,718.59**	**100.0**

Waste Management Activity	Change 2000-2001 Percent	Projected Change 2001-2002 Percent	Projected Change 2002-2003 Percent	Projected Change 2001-2003 Percent
Recycled On-site	-9.2	10.0	0.0	10.0
Recycled Off-site	-80.5	-11.0	48.1	31.8
Energy Recovery On-site	186.7	0.9	-0.3	0.7
Energy Recovery Off-site	34.8	-6.8	0.0	-6.8
Treated On-site	86.3	-1.9	0.0	-1.9
Treated Off-site	254.6	-6.5	0.5	-6.1
Quantity Released On- and Off-site	10.0	-1.2	0.3	-1.0
Total Production-related Waste Managed	**75.9**	**-1.7**	**0.04**	**-1.7**

Note: Data from Section 8 of Form R for 2001.

On- and Off-site Releases, 2000-2001

On- and off-site releases of these PBT chemicals increased from 827,035 pounds to 915,807 pounds from 2000 to 2001, an increase of 88,772 pounds or 10.7 percent (see Table 3-98). This was due to an increase in off-site releases (transfers to disposal), which increased by 95,597 pounds, or 17.6 percent, mainly due to an increase in tetrabisphenol A of 87,932 pounds. On-site releases decreased, by 6,825 pounds or 2.4 percent.

The increase in off-site releases (transfers to disposal) of these PBT chemicals was primarily due to increases in transfers to landfills/surface impoundments. Such transfers increased by 97,950 pounds or 18.2 percent. There were also increases in on-site releases to RCRA subtitle C landfills. Such releases increased by 1,429 pounds or 8.1 percent.

Most of the other types of releases of these PBT chemicals decreased from 2000 to 2001. On-site air emissions decreased by 6,793 pounds or 10.9 percent. Other on-site land releases (that is, other than RCRA subtitle C landfills) decreased by 1,372 pounds, less than 1.0 percent.

Table 3-97: Number of Forms Reporting Source Reduction Activity, by Category, 2001: Other PBTs

CAS Number	Chemical	Total Form Rs	Forms Reporting Source Reduction Activity		Category of Source Reduction Activity							
					Good Operating Practices	Inventory Control	Spill and Leak Prevention	Raw Materials Modifications	Process Modifications	Cleaning and Degreasing	Surface Preparation and Finishing	Product Modifications
		Number	Number	Percent of All Form Rs	Number	Number	Number	Number	Number	Number	Number	Number
118-74-1	Hexachlorobenzene	99	20	20.2	7	2	4	0	5	1	0	1
29082-74-4	Octachlorostyrene	4	0	0.0	0	0	0	0	0	0	0	0
608-93-5	Pentachlorobenzene	17	1	5.9	1	0	0	0	0	0	0	0
79-94-7	Tetrabromobisphenol A	48	19	39.6	8	1	1	4	4	0	0	1
	Total	**168**	**40**	**23.8**	**16**	**3**	**5**	**4**	**9**	**1**	**0**	**2**

Note: All source reduction activities on a form are counted in the corresponding category. Totals do not equal the sum of the categories because forms may report more than one source reduction activity.

Table 3-98: TRI On-site and Off-site Releases, 2000-2001: Other PBTs

	2000 Number	2001 Number	Change 2000-2001 Number	Change 2000-2001 Percent
Forms	173	168	-5	-2.9
	Pounds	**Pounds**	**Pounds**	**Percent**
Total Air Emissions	62,066.68	55,273.40	-6,793.27	-10.9
Surface Water Discharges	515.22	463.43	-51.79	-10.1
Underground Injection	60.29	23.50	-36.80	-61.0
Class I Wells	60.27	23.48	-36.79	-61.0
Class II-V Wells	0.02	0.02	-0.01	-28.6
On-site Land Releases	222,685.30	222,742.47	57.17	0.0
RCRA Subtitle C Landfills	17,578.20	19,006.97	1,428.77	8.1
Other On-site Land Releases	205,107.10	203,735.50	-1,371.60	-0.7
Total On-site Releases	**285,327.49**	**278,502.80**	**-6,824.69**	**-2.4**
Off-site Releases				
Storage Only*	0.00	0.00	0.00	--
Solidification/Stabilization**	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Wastewater Treatment (Excluding POTWs)***	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Transfers to POTWs****	0.00	0.00	0.00	--
Metals and Metal Category Compounds Only				
Underground Injection	0.00	0.00	0.00	--
Landfills/Surface Impoundments	538,434.34	636,383.93	97,949.59	18.2
Land Treatment	0.00	0.00	0.00	--
Other Land Disposal	670.00	303.00	-367.00	-54.8
Other Off-site Management	1,965.90	610.60	-1,355.30	-68.9
Transfers to Waste Broker for Disposal	601.00	0.10	-600.90	-100.0
Unknown*****	36.00	6.44	-29.56	-82.1
Total Off-site Releases (Transfers Off-site to Disposal)	**541,707.24**	**637,304.07**	**95,596.83**	**17.6**
Total On- and Off-site Releases	**827,034.73**	**915,806.87**	**88,772.14**	**10.7**

Note: On-site Releases are from Section 5 of Form R. **Off-site Releases** are from Section 6 (transfers off-site to disposal) of Form R. **Off-site Releases** include metals and metal category compounds transferred off-site for solidification/stabilization and for wastewater treatment, including to POTWs. **Off-site Releases** do not include transfers to disposal sent to other TRI Facilities that reported the amount as an on-site release.

* Storage only (disposal code M10) indicates that the toxic chemical is sent off-site for storage because there is no known disposal method. Amounts reported as transferred to storage only are included as a form of disposal (off-site release). See Box 1-5.

** Beginning in reporting year 1997, transfers to solidification/stabilization of metals and metal cateogry compounds (waste treatment code M41) are reported separately from transfers to solidification/stabilization of non-metal TRI chemicals (waste treatment code M40). Because this treatment method prepares a metal for disposal, but does not destroy it, such transfers are included as a form of disposal (off-site release). See Box 1-6. Reports under code M40 of metals and metal category compounds have been included in solidification/stabilization of metals and metal cateogry compounds in this report.

*** Beginning in reporting year 1997, transfers to wastewater treatment (excluding POTWs) of metals and metal category compounds (waste treatment code M61) are reported separately from transfers to wastewater treatment of non-metal TRI chemicals (waste treatment code M60). Because wastewater treatment does not destroy metals, such transfers are included as a form of disposal (off-site release). See Box 1-6. Transfers of metals and metal category compounds reported under code M60 have been included in transfers of metals and metal category compounds to wastewater treatment.

**** Reported as discharges to POTWs in Section 6.1 of Form R. EPA considers transfers of metals and metal category compounds to POTWs as an off-site release because sewage treatment does not destroy the metal content of the waste material.

***** Unknown (disposal code M99) indicates that a facility is not aware of the type of waste management used for the toxic chemical that is sent off-site. Amounts reported as unknown transfers are treated as a form of disposal (off-site release).

Waste Management Data, 2000-2001

Quantities of TRI Chemicals in Waste, 2000-2001

The quantity of these PBT chemicals in production-related waste increased from 7.6 million pounds in 2000 to 8.2 million pounds in 2001, an increase of 8.1 percent (see Table 3-99). The amount treated on-site increased by 306,299 pounds or 4.7 percent and the amount burned for energy recovery on-site increased by 229,418 pounds or over 163 percent. The quantity released on- and off-site also increased, by 77,690 pounds or 9.4 percent, and the amount treated off-site increased by 66,130 pounds or 229.5 percent.

Decreases were reported in the amount of these PBT chemicals in waste burned for energy recovery off-site, a decrease of 51,883 pounds or 88.8 percent. The amount of these PBT chemicals in waste recycled off-site also decreased, by 9,915 pounds or 79.7 percent.

Table 3-99: Quantities of TRI Chemicals in Waste by Waste Management Activity, 2000-2001: Other PBTs

Waste Management Activity	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Recycled On-site	6,605.50	5,964.10	-641.40	-9.7
Recycled Off-site	12,440.00	2,525.00	-9,915.00	-79.7
Energy Recovery On-site	140,662.00	370,079.64	229,417.64	163.1
Energy Recovery Off-site	58,433.80	6,551.30	-51,882.50	-88.8
Treated On-site	6,504,174.17	6,810,472.85	306,298.68	4.7
Treated Off-site	28,810.36	94,940.38	66,130.02	229.5
Quantity Released On- and Off-site	828,325.47	906,015.92	77,690.45	9.4
Total Production-related Waste Managed	**7,579,451.30**	**8,196,549.19**	**617,097.89**	**8.1**
Non-production-related Waste Managed	22,917.37	12,384.33	-10,533.04	-46.0

Note: Data are from Section 8 of Form R of year indicated.

Transfers Off-site for Further Waste Management, including Disposal, 2000-2001

As shown in Table 3-100, transfers off-site for further waste management, including disposal, of these PBT chemicals increased from 2000 to 2001, by 63,359 pounds or 9.4 percent. Other off-site transfers to disposal increased by 91,676 pounds or 16.6 percent. The amount of these PBT chemicals in waste sent for treatment off-site also increased, by 35,167 pounds or 75.0 percent.

Decreases were reported in the amount of these PBT chemicals in transfers to energy recovery. Such transfers decreased by 51,894 pounds, a decrease of 88.7 percent. Transfers to recycling of these PBT chemicals also decreased from 2000 to 2001, by 11,608 pounds or 84.0 percent.

Table 3-100: TRI Transfers Off-site for Further Waste Management, including Disposal, 2000-2001: Other PBTs

	2000 Pounds	2001 Pounds	Change 2000-2001 Pounds	Change 2000-2001 Percent
Transfers to Recycling	13,822.00	2,214.02	-11,607.98	-84.0
Transfers to Energy Recovery	58,496.90	6,603.00	-51,893.90	-88.7
Transfers to Treatment	46,890.31	82,057.37	35,167.06	75.0
Transfers to POTWs	11.66	29.90	18.24	156.4
Metals and Metal Category Compounds Only	0.00	0.00	0.00	--
Non-metal TRI Chemicals	11.66	29.90	18.24	156.4
Other Off-site Transfers*	0.00	0.10	0.10	--
Other Off-site Transfers to Disposal**	552,594.24	644,269.81	91,675.57	16.6
Total Transfers for Further Waste Management, including Disposal	**671,815.11**	**735,174.19**	**63,359.08**	**9.4**

Note: Transfers Off-site for Further Waste Management, including Disposal are from Section 6 of Form R.
* Other Off-site Transfers are transfers reported without a valid waste management code.
** Does not include transfers to POTWs of metals and metal category compounds.

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